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For the Southern Agriculturist.

EXAMINATION OF MR. EDMUND RHETT'S AGRICULTURAL ADDRESS—BY WM. ELLIOTT, ESQ.

Mr. Editor:—To every thing Mr. Rhett has said in praise of literary labor, I most cordially assent. I value as highly as he can do, the efforts of the school-room, the lyceum, the pulpit, and the bar. This were indeed a cheerless and dismal abode without them. It was not my purpose to depreciate their influence, but to rescue from neglect the interests of Agriculture, the great parent of production—without whose aid these cannot flourish—and on this very reason do I ground the high importance of Agriculture, as my words will shew. "Agriculture, which by multiplying *the productive power of the earth*, enables one to furnish subsistence for many—*disengages all who are thus supplied* from the necessity of searching for the means of subsistence,—*and thus leaves them at liberty to pursue the track of improvement!*" Whether "religion, education and government have not contributed more to the civil reformation of our times, than all other causes," are questions which we have not raised, and which we feel no present disposition to discuss. The true question which we did make was this—"Whether neglected Agriculture was not the great producer of National wealth?"—and our complaint was, that Government, *which it maintained*, withheld its patronage—and that Education, *supported by its gains*, was not suffered to shed its light upon it.

In speaking of literary labor, Mr. Rhett denies a position that we had taken, viz:—"that a scholar becomes a producer by writing a book." "Why is he then a producer?" asks Mr. Rhett. "Has he created or introduced any new material value? Not at all. For the value he has introduced is an immaterial thing—in every sense of the word. It has nothing of matter in or about it—it is briefly a collection of ideas, arranged and represented by *sounds* under the symbolic characters of *written language*." Since it appears to me that there is no difficulty in the problem, and that the interrogation can be most satisfactorily answered, I proceed with all brevity to reply—that *ideas*, however admirable, *while confined to the mind originating them* cannot be called *production*. They must be *uttered*—must be expressed by *sound*, which can have no being, apart from material organization—and must be *written*, which besides that organization, supposes material pen, ink and paper. It is *then* only, when these thoughts become associated with these mate-

rial elements—when this soul of a book is invested with its body—that it is properly *production*, becomes property—is protected by the laws, and besides giving profits to stationers, printers and booksellers, yields income to the Author, *and may be taxed by the State!* How would the gentleman bring his action for pirating the *unuttered* or *unwritten thoughts* of an author? How prove the invasion of a purely immaterial right? Who indeed could estimate the loss to the world, if material agency had not been invoked, to embody and perpetuate those bright imaginings, that have flashed forth from the excited human mind, like lightning from the thunder cloud; as bright, but without material agency—as fleeting too! In vain for us, without such agency, had the sweet bard of Avon, "warbled his wood notes wild." They had died where they were uttered, and not one vibration of the touching melody, would have floated across the broad Atlantic to charm us on this distant shore,—and in vain for us, without such agency, would the master genius of modern times have lived and toiled! How could the thoughts of Walter Scott have reached us, without being clothed in the material form of a book? For these thoughts, transmitted to us under this form, has he drawn thousands from us and from other delighted nations to himself, and to his native land,—and in this was he a great as *well as glorious producer?* More than all this, with what certainty would the very oracles of inspired wisdom have come down to us through the lapse of centuries, transmitted by the faltering tongue, to the mistaking ear, resting solely on traditionary authority—had they not been fixed and embodied in a material form; and as "THE BOOK" provided man with his highest consolations, and his sublimest rule of conduct?

The leading error that pervades the whole scheme of Mr. Rhett's reasoning is this,—he does not distinguish between *accumulation* and *production*. Wherever he finds the former he supposes the latter. Now we have shown that it is a thing not only possible, but of frequent occurrence, that persons should enrich themselves without adding anything whatever, in a moneyed sense, to the wealth of the State. But because persons, by services, or by the exercise of their talents, "originate the equivalents for which wealth is substituted," they are therefore producers says Mr. Rhett. At the risk of being tedious, we revert to this doctrine, and employ the plainest and most familiar illustration we can devise, to prove its utter fallacy.

Let us suppose a family of five boys, to whom their father may have given a dollar a piece for pocket money. They will have five dollars among them. But the elder wants something which the younger can do for him, or give him in exchange for his dollar, and for this he pays him over his dollar. Now the younger is richer, than he was, and the elder poorer, but the wealth of our little community has undergone no change, the younger is richer, *but without new production*—and as, with this little community, so pre-

cisely with the greater community, the State, (which is but an aggregate of smaller communities!) wherein professional and other services are likewise exchanged for wealth *without new production!*

Now suppose a ballad singer were to present himself before our little community, and offer for one dollar to give them a sample of his skill. The younkers eagerly consent, and contribute the required fee, in order to secure the proffered enjoyment. Now the ballad singer departs, richer by a dollar, and our little society poorer by the same amount, and should he repeat the performance five times on the same terms, he will have possessed himself of their whole wealth, and our little community would be bankrupt! Precisely so in larger communities, and this is one of a class of cases in which professional services may be rewarded, and the equivalent for wealth provided—not only without new production but with sensible impoverishment to the State.

Let us now advance beyond this miniature stage and adapt our illustration to a larger theatre, and to no unreal actors. The delight of two Continents—the beautiful and fairy like Fanny Ellsler visits Charleston in the course of her professional tour. Her uncommon merit is appreciated, and she receives five hundred dollars a night for her exhibition. She plays four nights and sails for the Havana. She has thus received two thousand dollars, and allowing that she has spent five hundred during her stay in Charleston, fifteen hundred remain in her strong box, and are transported with her to the Havana. Now as she has given *her equivalent* for this sum, the theory we are combating says she is a producer to that amount! But what says fact? That we are (in a moneyed sense,) losers to that amount! That so much substantial wealth is gone from us; and that all that remains in exchange is the dream like recollection of that impersonation of Grace! Now had this distinguished artiste remained in Charleston until she had expended the sums acquired there, still would she not have been a producer; she would have spent what she had accumulated—and while the circulation of existing wealth might have been quickened, the aggregate sum would have remained stationary.

To make the fallacy of Mr. Rhett's doctrine still more apparent, let us refer to an artist of a far different description—to that most despicable of all characters, the professional black-leg. He sweeps into his own pocket all the stakes that are hazarded; his winnings are drawn, it may be from the hands of industry, and from channels in which they were productive—they are spent, invariably spent, in the grossest profligacy. His winnings, whether from slight of hand, or from loaded dice, or from any other indirect practice, are *his own;* in his pernicious skill, he has given his "equivalent," such as it was—he *has amassed wealth, and therefore is a producer!!* Is the keeper of a tippling house a *producer*, because he enriches

himself by a trafic which degrades and demoralizes all who fall within its baleful attraction, paralysing at once the will to labor, and the physical effort necessary to production? Is the man who gives his equivalent for a lottery ticket, and draws the highest prize in the lottery a producer to that amount? Is the Tax Collector who receives in compensation for his services, ten per cent on the amount collected a producer to that amount? Did not all this money exist before in other people's pockets? (else how could it be collected?) and is not this *ten per cent* undeniably a part of it? True, the specific sum thus gained, is wealth to the party—it can effect purchases, and is given as an equivalent for what was production—yet most clearly, as we have shewn, is it *not* production. But see to what monstrous conclusions this maxim of the gentleman once admitted must lead. If whenever an equivalent is offered for production, there is new production; then as often as the equivalent is offered so often must production be multiplied! Ye Watts' and Fulton's hide your diminished heads! Here is a discovery fished up from the depths of political philosophy that puts all yours to shame! Away, from this date henceforth, with all fears of individual or national distress! While any product of value remains to an embarrassed household, it has only to be indefinitely exchanged, to be indefinitely multiplied!! And as for Nations! Here is a spell of potency to lay the spectre of Bankruptcy forever! The Minister of Finance, sitting with his fellows round the council board, has only to exchange the public treasury —or the national domain—for any proffered "equivalent"—even were it, for unsubstantial "immaterial services"—and Presto!— New wealth is generated for the service of the State—new navies ride in her roadsteads—new armies spring to her defence, and Plenty pours her full horn of blessings over the smiling land!

In sober seriousness we declare, that we intend no exaggeration, but have merely sketched out the consequences that flow naturally and legitimately from the gentleman's premises, *provided they be correct!*

I now come to a passage in Mr. Rhett's address, which calls for special comment, and have marked with italics those portions to which I would particularly invite the attention of the reader. I regret that in the six months which intervened between the delivery of the Address and its publication, the author did not think it expedient to extend his emendations to this passage, which as it stands, is in my view, disparaging to the planting interest and unjust to myself. Here is the extract—"It is worthy of remark, (says Mr. Rhett,) that the argument *formerly* was, that the Agriculturist was the only producer, *because he was the only person with whose labor the laws of nature co-operated.* But let us take it as it is *now* put. How much let me ask, of what the Planter calls the product of his labor, does he really create? From the seed to the harvest, how

much of *the Creator is there in the part he plays?* Does he give richness to the soil, pregnancy to the seed, moisture to the clouds, or warmth to the sun? Is he master or ruler over one in a thousand of the circumstances contingent or fixed, concerned in the production of his crops? What is his sovereignty? Where does it begin? Where does it end? What has it accomplished? A little stirring of the earth; a few seeds carefully strewn; an implement or so judiciously used—*by hands too—not his own!* and this slave of the seasons, this stipendary of chance, stands forth *the proud creator of all wealth*; at whose smile Commerce decks the seas, Philosophy lights her lamp, and Justice builds her throne. The poor clown who awoke and found himself ruler of the Faithful, was hardly more amazed at his metamorphosis, than the distrustful, unobtrusive planter must be, on hearing *this miraculous account of himself.*—Vanity may whisper in his ear, that the truth of the thing is not surpassed by its novelty. But he is too shrewd a man not to discover very soon, what he knew well enough before, that like other mortal men, he is in the strictest sense, *an instrument of the laws of nature, and that he cannot throw off or dispense with their dominion.*"

The *now*, in the above passage, necessarily refers to my Address already quoted, (for though two years had elapsed, no one in the interval, or at any other time indeed, had addressed the Society on the subject of production;) and the opposition between *formerly* and *now* leaves no other grammatical construction to be put on the sentence than this—that I had maintained that the Planter was a producer *independently of the laws of nature!* Now I ask on what authority the gentleman has founded so preposterous a charge? I defy him to find any better sanction for the assertion than such as he may derive from his own misconception of the word "create," as applied to the production of agricultural value! a word familiar we should suppose, to all readers on political economy, as expressing more strongly than any other term, the distinction between *originating values*, and *appropriating values* already in being.—Alluding to a Poet, do we not speak of the creations of his muse, without subjecting ourselves to the charge of impiety or requiring a commentator to explain the sense of the word? Do we not familiarly speak of the creations of manufacturing skill, and may we not with the strictest analogical propriety, speak of the creations of Agricultural industry? What more common, when alluding to a picture, the master-piece perhaps of some distinguished Painter—than to speak of it as *the creation of his pencil?* Yet, were an Artist (in addressing a Society of Painters,) to use this phrase, would it be incumbent, think you, on some scrupulous member, to warn them against the peril of a too literal understanding of the word? "Talk of your creation? (he might say,) How much do you really create? It is nothing but a little skill in drawing, coloring, and perspective! A few strokes of the brush—*an instrument*

or so judiciously used, that is all! Be not vain glorious! You did not create the very pencils which are your instruments, no, nor the colors which you spread on the canvass, nor the canvass itself—least of all this glorious sun—without whose light your triumphs would be lost!" Just so apt, and just so called for by circumstances of the case, are these observations, addressed by Mr. Rhett to the agricultural class—unwarranted, I have shewn, by any thing more than his own misconception of this same word, create. Why then we ask, should this word be tortured from the sense it plainly bears, from the sense in which Mr. Rhett himself uses it, to take a signification which ascribes to him who uttered, and to all who adopted it—the extreme of arrogance or impiety? The Society addressed by Mr. Rhett, and which he deemed competent to judge of, and appreciate his highly metaphysical discourse could scarcely (to my thinking,) require to be told that they did not control the elements, and were not creators in the same sense in which the Almighty was a creator!! But the planter required, it would seem, to be rebuked for his presumption, for "he stands forth," says Mr. Rhett in the same paragraph, "*the proud creator of all wealth.*" I deny that I have said this, or any thing like it—and I am astonished that Mr. Rhett should do me the injustice to impute to me any such doctrine, when the contradiction was staring him in the face.—Speaking of Authors—I said, in the very Address that called forth his remarks "they are *productive laborers*, as well as the *farmer, manufacturer, merchant or mechanic!*"

"*By hands too—not his own.*" Whatever merit may be subtracted from the planter, as a producer, by setting forth this fact, it is clear that Mr. Rhett cannot be entitled to the benefit of it: for *labor* is, according to his view *immaterial*, and these *material, servile hands* can therefore have no place in his estimate! With us, however, the case is different, and we admit, that the directing mind and the executing hand, have each their share in the credit of production, though in what proportions, it is foreign to our purpose to inquire. "*On hearing this miraculous account of himself*" I have called the Planter the *chief producer.*

If *this* makes him a wonderful person, then he is truly and bona fide such: for any thing beyond this, there is no miracle but what Mr. Rhett has worked out for himself! But I forbear—and gladly turn from a further analysis of this objectionable passage with this closing remark,—that the Society, in my opinion, may have been spared an argument, to convince them "that they were dependant on the laws of nature and subject to their dominion," since had I been absurd enough, to have questioned so important and apparent a truth—their acknowledged intelligence would have made the sophism harmless!

Having now disposed of what Mr. Rhett has said in reference to doctrines, that I had held, or which he assumes that I had held, I

shall indulge in a few remarks on the remaining portion of his Address.

While denouncing the Forty-Bale Theory of Mr. McDuffie, Mr. Rhett observes—"If there is one opinion in which the people of this State are more agreed than another, it is in the truth of this theory." I dissent entirely from this opinion. I believe that the majority of our people do not, and never did give their sanction to that doctrine. No, not even in the very storm and whirlwind of party excitement. It was indeed the pass-word of a dominant party, and I well remember that reproach and persecution were the portion of those who failed to pronounce the shibboleth.—But if *the people of this State* did ever assent to this doctrine, (which I greatly question,) surely they do not *now*, when nine years of reflection have given time for party zeal to cool—and when its utter unsoundness has been so clearly demonstrated. To suppose them still enthralled by its often refuted fallacies, is any thing but complimentary. But admit that the doctrine is a fallacy, the error does not lie in supposing the great exports of the South, to be the production of Southern planters! If the cotton, rice, and tobacco, which confessedly constitute these exports, be not *their* production, in the name of common sense, who did produce them? Mr. McDuffie's mistake lay in this—that he supposed a continuance of the planter's interest in his produce, after he had parted with it and had been paid for it,—been paid for his hundred bales, not for his sixty; and at a price regulated by the current rates at Liverpool! Now, if the planter had shipped the cotton on his own account, and invested the whole proceeds in foreign goods, paying forty per cent duty, and consumed the whole, then he would have paid the whole duty as supposed by Mr. McDuffie. But did such a case ever occur? (Or if it did, was it not the rare exception to the rule, and not the rule itself?) No! at this stage, there is the intervention of a new *owner*, the merchant. The merchant lives by his profits. He buys the cotton here, because he expects to sell it to his Liverpool customer for more—and he buys his goods there, because he he expects to sell them to his American customers for more. He does not look back to the planter for remuneration, but forward to the consumer. The cotton may be bought by a Northern merchant for a remittance—he invests the proceeds in foreign goods, and brings them back to Boston for consumption. Who pays the duties? The planter? No! the merchant, in the first instance, who adds the amount to the cost of his goods, and thus reimburses himself, leaving it to the consumer ultimately to pay. Now it is evident, that if the Northern consumer pays the tax, the Southern planter does not—which amounts to a complete refutation of the Forty-Bale Theory. I know not what Mr. McDuffie *now* thinks of of a doctrine which stood, mainly I think, on the authority of his name; but I do him the justice to believe, that he was thoroughly

in earnest—that he supported it from conviction, and was too direct in purpose and scrupulous as to means, to have promulgated a fallacy for political effect.

But let the credit which now attaches to this celebrated theory, be great or small, and let its ultimate fate be what it may, there is no fallacy whatever in the doctrine "that an economical government, and a free trade are blessings to a country," and to none more than to an agricultural and producing country. If the producer does not pay the tax on imports he may nevertheless, under a system of commercial restrictions, *lose as much as if he did;* without having the consolation even of reflecting, that the country at large was benefited by his loss. He may be taxed out of a foreign market (for every foreign nation will retaliate restrictive measures, as far as it dares,) or, without supposing this retaliation—the foreign product, with which our products are purchased, may be taxed out of our own markets, and the result will be equally fatal to his prosperity, for we cannot cripple the resources of our foreign customer without feeling the reaction on ourselves. The customary outlet for our products is wanting—the demand abates, the price declines, the commodity is sacrificed, and the loss is positive and irretrievable to the producer, while the unreplenished and unsatisfied treasury craves other sources of supply.

But to return to the matter more immediately before us.—In whatever stage of society you consider man, you find him beset by two engrossing wants, that of food and clothing. These are indispensable, you *must* satisfy them. Give him bread for food, and clothing to protect him from the inclemences of the season, or he perishes. Now this grain—this material wealth—this invaluable product of agricultural labor, must be *grown* in your own country *or paid for*, if imported from another. And the same thing is true of what constitutes the clothing of a country. You must produce it, or pay for it if produced elsewhere. Now the enviable peculiarity of the position occupied by the Southern planter is this, that he is at one and the same time the producer of two of the most valuable staples in the world, that are at the same time essential to human life!! I have no desire to detract from the value of those mechanical labors, which having given a fixed habitation to man, extend to the arts that provide for the comforts and embellishment of social life; but surely that people have their prosperity based on the broadest and surest foundation, who rely on such products as are essential to life itself, rather than on such as minister to the wants of refined society; since for these, every caprice of fashion may destroy the demand and involve a total sacrifice of the time, skill and capital employed in their production. Now it should not be a subject of presumptuous boasting, but certainty of honest pride and self gratulation to the Southern agriculturist, that his productions are essential to the support of life, and the very existence of

society; that his country must be enriched by their possession, or impoverished, by the necessity of getting them from abroad; that while some pursuits are hostile to production—his, are eminently productive—that while in others production is an accident, in his it is inherent—that the planter in fine, cannot make for himself without producing for the State, and (if it may abate envy to say so,) is thus a patriot in spite of himself by the mere force of his position!

Must every effort, to press these views upon the public attention, be met by ridicule, or answered by angry denunciation? be treated as an offensive attempt to derogate from the merits of other interests, and exaggerate the importance of Agriculture? If it be true, that this interest pays the bulk of State taxes, and supplies those great staples which constitute the exporting wealth of the country, is it not plain that its value can scarcely be overrated, and that it is every way entitled to receive the fostering care of the Legislature?

Agriculture has nothing to dread from discussion. Its claims will appear the stronger the more they are examined. The more they are denied, the more firmly will they be established! I hail the indications of the times—the auguries are favorable. Associations are rapidly forming to promote the interests of that leading pursuit, which has suffered not less from private than from public neglect. They whose peculiar province it was to act, have set the ball in motion, and public opinion will before long, demand the Legislative encouragement of Agriculture, with a voice too authoritative to be despised. Instead of that faint advocacy which is daunted by the slightest obstacle, or that hesitating support which will not choose at all, between conflicting plans, lest it might choose wrongly; we shall have a determined zeal, which will not waver until this great but neglected interest shall receive from the Legislature the countenance and encouragement, which on every ground of policy or justice, it is rightfully entitled to expect.

I am, respectfully, Mr. Editor,

Your obedient serv't.,

WM. ELLIOTT.

ON IRRIGATION.

Washington, April 2d, 1841.

To the National Institution for the promotion of Science:—

Since the brief statement of the advantages of irrigation appeared in my discourse delivered before the institution in January last, I have received so many applications for information on the manner of watering land, that I am induced to believe a more extended notice of the subject may be acceptable and useful.

The numerous and abundant rivers, streams and brooks which traverse our country in every direction, afford great facilities for irrigating the soil, and thousands of acres of barren land might thereby be rendered as productive as any in the United States.

The thin soils, which drain and dry easily, profit most by the use of water, and are the least productive without it. The gravelly, sandy lands of Chile produces by irrigation, upwards of thirty bushels of wheat to the acre, and the poor lands in the neighborhood of Mexico, are made equally productive by this process. The great advantage, however, to be derived from the free use of water is not so much in the increase of grain, as in that of grass crops.—A water meadow attached to a farm gives the farmer an abundance of manure for that portion of his land, which he keeps in tillage; for he may convert into dung the whole of the hay it produces, while it requires nothing in return but watering.

In the Carolinas and Georgia the low lands bordering on the rivers are irrigated as high up as the influence of the tide extends for the cultivation of rice. The water is admitted into ditches parallel and perpendicular to the river, and thence distributed by feeders over the whole surface so as to drown the land, by opening the sluices when the tide is rising; and after keeping it there as long as is deemed necessary, it is let off at low tide. This method might be practised with great advantage on all the tide-water rivers throughout our country where the banks are low enough to admit the water at high tide. Flat lands that have not the advantage of tide water are the most difficult to irrigate successfully, for it is essential that when the water is let off, the land should be drained perfectly dry; otherwise it will produce coarse grass of inferior quality. Lands that have a gentle slope, even steep hill side, are better adapted for irrigation, as they admit of the water flowing over them without covering the top of the plants, thus giving them the advantage of air and moisture. A gentle current is considered more advantageous than stagnant water, and the land thus situated will always drain dry when the water ceases to flow. On level land it is necessary to conduct the drain so far that it may enter the river low enough to ensure a sufficient fall to dry the land.

Where the stream is rapid and the fall great, it is not necessary to construct any dam; but simply to tap the river high enough up to lead the water along the highest part of the field; but where the current is sluggish, the water must be raised by a dam erected at the point where it is to be used.

There are two methods of watering lands. The one by dividing the field into regular beds, and the other by what is called *catch* work, which is resorted to where the form of the ground is irregular. It varies therefore with the circumstances of the land it is proposed to water; but the conductors, feeders and drains must be

laid out so as to profit by the natural movements of the soil both to water and to drain it.

The first thing to be done by the farmer who desires to irrigate his fields, is to take an accurate level of the ground he intends to water, so as to compare the highest part of it with the height of the water to be used. The surface of the water must be eight, twelve or twenty inches higher than that of the land, according to the distance of one, two or three hundred yards from the one to the other. The main conductor is then to be cut from that point as straight as it can be, to lead to and continue along the highest side of the field. If the land has any swells on its surface higher than the rest, it will be necessary to give to each of them its own conductor, with feeders branching from it, to convey the water over that portion of the field. The width of the conductors must depend upon the quantity of water they are required to convey; and be deep enough to receive the muddiest portion of the stream; for although the land will profit by being covered with clear water, it is more enriched by the deposit of turbid streams. Each conductor is to be provided with a sluice to regulate the admission of the water. In case the river does not run in such a direction as to allow the water, after flowing the land, to be discharged directly into it, a main drain must be cut along the lower part of the meadow to receive the surplus water and convey it into the river.—This should be of the same dimensions as the principal conductor. The portion of meadow to be watered by each conductor is next to be divided into beds from thirty to fifty feet wide, the feeders, which branch at right angles from the conductor, running along the centre of them, except where the ground falls two ways, when it may be necessary to make the feeders nearer to one drain than the other. A bed two hundred yards long will require a feeder where it leaves the conductor to be twenty inches wide, and gradually diminishing in width to twelve inches at the extremity. A drain is to be made between every two feeders, and parallel to them of the same dimensions, but reversed form; the upper part being ten or twelve inches, and the drain gradually widening to twenty inches, where it terminates either in the main or in the river. Supposing these works finished and ready to go into operation, the manager opens the sluice to admit the water into the conductor where he adjusts the stops in such a manner as to supply the feeders. He next regulates the stops in the first feeder, so that the water shall flow regularly over its sides from one end to the other. He then repeats this process in the second feeder, and so on until all the feeders are adjusted. The stops may be of pieces of board or of turf pinned down if necessary, taking care to keep the heads of the pegs below the surface of the water, otherwise they are apt to collect weeds and trash.

The rule in Europe is to flow the land throughout the months of October, November, December and January, letting the water run ten or fifteen days at a time, and keeping the land perfectly dry during the intervals. This can only be done in situations where it is not liable to freeze hard; for a sheet of ice forming over the soil would injure it. In February it is recommended to water in the evening and let the water off early in the morning; this practice is continued through March and April, the water during that period being never kept on the land more than two or three days at a time. From the first week in May the land is left dry until the grass is cut and the hay harvest is over, when it may be watered again for a short time, to secure an abundant after grass that may be fed off.

The profits arising from irrigation are so great that they will justify a considerable outlay. The works, therefore, ought to be well and durably constructed; the dams and sluices of the best materials, and able to resist the sudden rising of the water. The beds which as already stated, are to be from thirty to fifty feet wide, should be raised from one foot to fourteen inches in the centre, so that the water will fall gently off from the feeders which run along their summits to the drains.

Where an old and well set meadow is to be watered, it is advisable to lift the turf and level and prepare the sub-soil, re-laying the turf after the beds are made. This process of lifting the turf and relaying it after ploughing and manuring the sub-soil of old grass lands is practised in the best agricultural districts in Europe with great advantage, even when it is not intended to prepare them for irrigation; but only to invigorate the growth of the grasses. If when the works are completed, the soil is to be ploughed up and levelled, it will require two or three years before it will be sufficiently set in grass to allow its being watered without working.

I have endeavored to give such a description of the process of irrigation as will at least enable a farmer to judge of the practicability of watering any portion of his land, if not to execute the work himself. Those who seek for further information on this important subject, may consult the works of Boswell, Wright, Smith and Johnson, Loudon's Encyclopedia of Agriculture, and Stephen's Practical Irrigator. The construction of works for irrigation belongs, however, to the civil engineer, and it is to be hoped that those of the United States will turn their attention to the subject. Our extensive lines of canals may, for the most part, be converted into conductors, and the water be beneficially used to fructify the country through which they pass. If a blessing awaits the man who makes two blades of grass grow where only one grew before, the irrigator will be thrice blest; for well watered land will produce at least three times as much grass as the same quality of soil under dry culture.

J. R. POINSETT.

For the Southern Agriculturist.

ON THE USE OF LIME AS MANURE.

Mr. Editor:—It is unfortunately a trait in the character of the Southern Planter that he regards all novelties with suspicion.—Any departure from the practice of his fathers, or his neighborhood, he considers dangerous, and the generality will deride as vain theory, the efforts of the man who will have the courage to make an innovation upon established precedents, or to violate a rule dictated by one of the patriarchs of a neighborhood.

This cautious spirit if united to a liberal enterprise, is highly commendable; he who possesses it will incur no rash risks, while he will avail himself of all the lights of modern research; but unfortunately we too generally find the caution without the enterprise.—The sneer of the practical man withers the energy of the enthusiastic speculator, and the old routin of practice continues to be popular because nothing short of absolute demonstration will convince the man of practice that the theorist is not a madman.

In your editorial career you have suffered from this prevailing spirit. The practical man will not write, because he has nothing new to communicate His practice is the same now as it was yesterday, and as he thinks it will be to-morrow, and is known to all engaged in the same pursuit. The speculator dare not write, because he knows that the first question which will be asked when his essay shall have been read, will be—What sort of planter is he? How does his practice square with his theory? Is he a practical man? If the answer to this question be not satisfactory, he will be condemned as one who presumptuously pretends to teach, while he ought yet to be sitting at the feet of Gamaliel. "He writes better than he plants." If a more damnatory specimen of faint praise were ever uttered, I have not had the misfortune to hear it. My imagination can conceive of nothing more killing.

I am surprised that the Planters of lower Carolina have as yet derived no benefit from the publication of one of the most valuable and practical essays of the age, (I mean Mr. Ruffin's essay on Calcareous Manures.) Several years have elapsed since its first publication, and notwithstanding the knowledge that it has revolutionised agriculture in lower Virginia, I believe that hitherto not one planter in South-Carolina has used lime but as a pretty and useless experiment.

The book came out too, at a period when South-Carolina was suffering severely from the emigration of her citizens. Exhausted fields, lying over large beds of lime were deserted, in some instances they were literally abandoned, and at best they were sold as lands hopelessly worn out, and their proprietors went to the great Western Valley to seek richer lands, a main feature in the consti-

tution of which was the presence of lime. Notwithstanding the known character of Mr. Ruffin, for intelligence and probity; notwithstanding the labored details of experiments which teach the reader that he has got among stubborn facts, and not idle theories; notwithstanding that it is a history of what has been effected in lower Virginia, a territory differing but little in character and climate from our own, yet the book which unfolds its beneficial agency is with us almost unknown; the lime remains in its natural bed undisturbed; its very existence is by many questioned, and the fields lying but a few feet above it, and which with its application can be put in a state of progressive improvement, are undergoing yearly, a progressive deterioration.

The extent of the lime-stone region in South-Carolina is as yet unknown. There is every reason to believe that it commences immediately below the falls of the great rivers, and continues to the sea. The stratum varies considerably in thickness. I apprehend that its maximum thickness is at or near its termination in the uplands, and that its minimum is at or near the sea coast. It is certainly much thicker at the Eutaw Springs than in the known localities twenty miles below.

The position of the lime is various. At the Eutaw Springs and in its vicinity, in the neighborhood of McCord's Ferry and near Monk's Corner, on Cooper river, it frequently rises to the surface and a little above it. On the elevated lands bordering on the various swamps and creeks which form the head of the latter river, it has been found as low as from ten to twenty feet below the surface.—On the margins of creeks, and near the point of junction of upland and swamp land, its depth below the surface is but a few inches, and generally, except where the land rises abruptly to a considerable elevation, it may always be found at the depth of from four to eight feet.

If I might presume to propose a general rule from my limited observation, I would suggest the following as the indication of a bed of lime, viz :—whenever the upland adjacent to a stream of water produces a growth of hickory, red oak, dogwood, locust or walnut, lime may be dug for with a certainty of success; when on the contrary, the uplands produce only long leaf pines and scrub-oak, the search for lime will be unavailing. The streams of the former class abound in mucecl shells and craw-fish, and the uplands in snails; none of them, certainly not the muscle, will be found in the pine land streams.

The appearance of the lime varies in different localities, but the fragments which have been subjected to analysis, exhibit generally about ninety per cent of alkaline earth,—how large a portion of this is magnesia, is a question not yet settled by the chemists. In some places near Santee river, below the Eutaw, and at Godfrey's ferry on the Peedee, the lime is found in a bed of loose shells partially

pulverised, and may be carried immediately from the pit to the field, without further preparation. It is generally a hard rock full of fossil-shells; frequently the rock is so hard that when smartly struck with a hammer scintillation will follow. This of course will require either fire or the hammer to render it fit for the field. If a quantity of this hard stone is thrown up in the fall, and exposed throughout the winter months, it undergoes disintegration.

I have no correct data for ascertaining the amount of labor necersary for obtaining lime. Mr. Ruffin, who has been in the habit of spreading from three hundred to seven hundred bushels of calcareous earth to the acre, (equal to from one hundred to two hundred and thirty bushels of Carolina lime,) states that a single man, employed throughout the year, will dig enough to manure sixty acres of land. Two years ago, six men in three weeks dug for me eighteen hundred bushels—this was equivalent to the labor of one man for nine weeks or fifty-four days. With this amount of lime I manured eighteen acres of land. I believe that my hundred bushels of lime are fully equal in value to Mr. Ruffin's three hundred bushels of calcareous earth. Now as it required the labor of three days to manure one acre, if we take an average number of two hundred and seventy days as the number of working days in the year, then the labor of one man would at that rate of manuring furnish enough lime to cover ninety acres of land. If the relative values of the Carolina and Virginia manures have been justly stated, we may presume that the value of the products of labor will be greater in Carolina than in Virginia, because it is to be supposed that when the liming is pursued as a systematic part of the operations of the farm, the means employed in procuring it must be more convenient than any I could command, when only engaged in a crude experiment.

Following the practice universally adopted in Carolina, viz:—to devote our attention to the market crops almost exclusively, considering every other as a secoudary object, my experiments with lime have been made only on cotton. I have made two experiments; the first in 1839, a year remarkable for dryness and great productiveness; the second in 1840, a year as remarkable for humidity and comparative failure. In each year the result was most gratifying; the most decidedly marked success was in the dry year. After one year's cultivation the land was suffered to rest. The field limed in 1839 produced a less abundant crop of poverty grass than the circumjacent lands not limed—and a more luxuriant growth of crab and joint grass. The field of 1840 is now at rest.

I am aware that our planters will not consider the improvement of the joint grass a desirable object. That is a grass that is said to delight in a calcareous soil, and it might spread more rapidly on such, than on lands free from calcareous earth. Every one who owns an old plantation, is aware that joint grass is no stranger, even to the

poorest lands. If lime then be really a fertilizing agent, let us not object to it because it does not prove a panacea for all the evils with which our ignorance, or our carelessness, or the behests of a wise Providence have strewn our path.

Mr. Ruffin observes, that they who wish to use calcareous manures must make the digging of it a branch of the regular farming operations. Any system of manuring, we know must, to be efficient, become a part of the habitual operations of the plantation. Trusting to the chance of obtaining lime during the season between hoeing and harvesting, I made no other provision for it last year, but classed it with the rest of that miscellaneous jobbing operation called fall work. But in the fall the water had taken possession of my pits, and I had land to clear, and other causes prevented me from obtaining a bushel of lime. The opening of a small body of land, together with the rains of August and September, have stopped for this year my course of experiments. How frequently do we hear the opening of lands alledged in excuse of neglect in many operations essential to good husbandry. It excuses the wants of manure, the inefficiency of ditches, the insecurity of fences, the delapilated state of the plantation buildings, and the wants of many comforts, which as enlightened citizens and men of substantial wealth, we should not want.

I am no enemy either in theory or in practice to the clearing of our forests—but I think the time has come when it should be done with great caution. Our upland forests of prime quality are nearly exhausted. They are our only resources in the country for good fuel, an article which in some vicinities has become frightfully scarce. Unless necessity therefore should compel, or strongly advise their destruction, they should I think be husbanded as a resource of wealth and comfort at no distant period. The system pursued by our predecessors was, to clear a piece of land and cultivate it to death. It was then suffered to recover some strength and throw up another growth of trees, while other forest lands were subjected to the same system of exhausting cultivation. In the course of time the new forests were again reduced to cultivation and again exhausted, but in a much shorter period than at first.

A system of resting then followed. After a long period farmers began to apply manure, and now commenced a system that promised really to give to the planter the character of a cultivator of the soil. Now we may look for improvements that shall be permanent, and it is to aid in perfecting this system that I have felt it my duty to contribute my humble efforts, by saying a word or two in favor of lime.

Many a planter who would shrink from the appalling labor of liming his land, will not hesitate, if it is convenient, to clear land, even though it may not be necessary. Let us estimate the labor

necessary to prepare for cultivation a field of ten acres, by two methods of clearing, and of liming.

Let us suppose first a piece of prime upland to be cleared, then the labour account will stand as follows:—

1st.	Underwooding—to each acre 8 hands:	equal to 80	days work.
2d.	Felling and cutting up trees, 8 " "	80 "	"
3d.	Log rolling, firing, &c.: to each acre 2 hands,	20 "	"
4th.	Listing: to each acre 8 hands,	80 "	"
5th.	Bedding: to " " 8 "	80 "	"
		340 days work.	

To obtain this field then, requires an expenditure of three hundred and forty days of labor. No account has been taken of the labor of women and children engaged in raking, firing, &c., nor of the labor necessary for ditching, fencing, &c. During the first year of cultivation the usual task of half an acre cannot be performed, and even in the labor of preparation for the second crop, short tasks are necessarily given. This field will endure constant cultivation for five or six years. After that period it will require rest and manure. The first crop it must be observed, is always an uncertain one. A prudent speculator will never make a large calculation on the issue of a crop sown on fresh lands. Let us now suppose an exhausted field to be brought into cultivation with the aid of lime.

I have already stated that it required the labor of three days to procure lime enough for one acre of land, at the rate of a hundred bushels per acre. Thirty days labor will then be required to manure ten acres at the same rate. Suppose the quantity doubled and two hundred bushels be applied—here then will be required the labor of sixty days. Add an equal number of days for burning, hauling and spreading, and the lime will be on the ground at the cost of one hundred and twenty days labor. Deduct this amount from three hundred and forty, the time required for the preparation of forest land and there will be a balance of two hundred and twenty days left to devote to any other preparation of the land you may deem advisable. The lime once spread, the labor is over; full tasks become the order of the day; and the planter may rest with the assurance of *all* who have given the lime a fair trial, that he has put on his land a manure whose beneficial agency time, so far from destroying, will continually develope.

It is a common opinion, that Clover will not endure the hot sun of South-Carolina. This opinion is not more prevalent with us now than a similar opinion respecting the adaptation of the climate of lower Virginia to Clover, was, a few years since in that State.—Since the introduction of the use of calcareous manures the cultivation of clover has become universal in lower Virginia. It is

evident therefore, that it was the want of *something* in the soil, and not the warmth of the suns rays, that was at fault in Virginia. I have for three or four years past, been watching a little experiment which induces me to believe that it is not the sun, but the soil of Carolina which is fatal to the growth of clover.

A few years since I received from a friend several varieties of grass seeds which I planted in my garden on the borders, immediately under the walls. At the commencement of summer I had a promising crop, but in autumn it was all dead. The following winter I observed a single plant of clover growing on the north border. To this plant I applied lime liberally. It flourished during winter, and in May proved to be red clover. The following winter the clover was still there. It had spread. Lime was again applied. It has continued to improve, and bids fair to overrun my garden.

Now this I admit is a very small experiment to base a large hypothesis upon—but it is not on that account the less valuable. Here is a single plant which has survived the first summer, observed during the winter, small and sickly, treated with lime, the manure which all farmers have declared to be indispensable to clover, thriving under the treatment, bearing with equal success the heats of '38; the droughts of '39, and the rains of '40. It must be observed too, that if the hot sun is injurious to clover, the position of this plant has been a most unfortunate one. Placed on the south side of a wall it is never shaded but by the very early and late suns of our longest days, and in addition to the direct rays of the sun, it is exposed to all the heat radiated from the wall.

I do not despair of seeing lime in general use in the limestone regions of South-Carolina. Improvements of all sorts are slowly adopted by Agriculturists. In consequence of the great absence of planters from their estates, they adopt new methods more slowly than any others who derive their subsistence from the soil. A few years since it was a mooted question at every parish club in the low country, whether the profits arising from manuring our fields were great enough to authorise the expenditure of the labor necessary to collect the manure. Nor was there wanting many who even doubted whether it was of any use atall.

It seems never to have entered into the minds of such persons that the highest attribute of man is his capacity for improvement to an indefinite degree, not only of himself, but of every thing committed to his government, and that he never so completely fulfils his destiny as when exercising this capacity; that Providence has deprived us of an Eden in order that we might, by aspiring after its possession, exhibit the greatness of our intellectual resources in their most beneficial aspect; that to impair the value of that which he has given us to use and transmit to our successors, is disobedience and a wanton abuse of his goodness. Such reflections have

come home to us when contrasting our declining condition with the present prosperity of others, who in a more richly gifted region are following the destructive example of our fathers. Animal and vegetable manures have forced themselves into general use, and I have no doubt that in a few years we shall see the powerful agency of the mineral manures exercising the happiest influence over the destiny of this State.

A SPECULATOR.

NOTE.—I have carefully abstained from any hypothesis respecting the modus operandi of lime. Mr. Ruffin is disposed to regard it as valuable, chiefly as a corrector of acidity. That it has other valuable qualities is highly probable. It has made me good cotton when the land immediately adjacent produced absolutely nothing but a few scattered and half grown stocks.

Respecting the composition of our lime stone, I have seen two statements differing widely. Dr. Johnson finds about thirty per cent of magnesia. Mr. Shepard finds little or none, and this difference too in specimens from the same locality. Viewed as a corector of acidity, the magnesia is perhaps as valuable as the lime, and the value of the manure would not be less in consequence of the presence of so much magnesia. Writers on Agriculture have always represented magnesian earths as unfruitful, and ungrateful. This may be true, but it does not follow that a small quantity of magnesia added to the soil may not be advantageous to it. A soil overcharged with lime, would be as poor as one overcharged with magnesia.

Apart from the *mechanical* agency of lime on soil, I apprehend that its value is not greater than would be that of any other alkali. I have seen twenty bushels of ashes produce results quite as satisfactory as a hundred bushels of mild lime. Whether it exercises an agency for any length of time, I have not the means of ascertaining, but as an auxiliary manure to the growing crop, I consider it so valuable, that I have all the ashes on the plantation carefully husbanded. A small reward offered to the negroes induces them not only to save their ashes, but (I have had reason to believe,) to burn more wood for the purpose. Any one who has not tried the experiment would be surprised to find how much may be collected by holding out an inducement.

TILLING OF INDIAN CORN.

THE seed is now mostly in the ground, and the attention of farmers must be turned at once to the hoeing of their growing crops. It was the custom of this vicinity only a few years since, to plough deep between the rows of corn, and make a very high hill. This process was deemed essential in a good husbandry. The farmer who made but little hill, and left his corn to be supported and kept in an upright position by the helps which nature's *Author* furnishes, was ridiculed for his oddities, or abused for his slovenliness. We were educated in the belief that the high hill would give the largest corn. This opinion held its place in our mind until within seven years. We recollect distinctly defending that course seven years ago the present summer. And we did it in good faith. But at that time we were more familiar with theology, than with the processes of nature in the fields. Recently our studies have been more in the field than in the closet; and no plant has interested us more than Indian corn. In the summer of '34 we parted the ties, and left the cares of professional pursuits, and sought for health in the fields where our ancestors had long toiled. There the fashion which prevailed in our boyhood of hilling high, had lost much of its hold; in the corn field we found what seemed to us slovenly and insecure hoeing. Soon (in the latter part of July,) there swept over our neighborhood a violent wind, accompanied by a most copious fall of rain. The corn yielded to the storm, and lay prostrate, or nearly so. We thought that the folly of omitting to hill was proved. But in four or five days from that time the corn was erect as ever, and we believe that scarcely a stalk was broken on the four acres; while some of our neighbors, whose corn was surrounded by more hill, and which was not laid so flat, were obliged to go through their fields and cut out broken stalks in large quantities. Our corn that year was the largest we ever had, giving ninety-five bushels to the acre. (The excess that year, is, perhaps, to be ascribed to the fact, that the land on which it grew had been *pastured* for several preceding years.) But the rising of the corn, after it had been blown down, led us to inquire whether it could be satisfactorily accounted for. There is little doubt that it can.

Farmers all know that about the time when the ears *begin to set*, brace roots shoot out from the stalk just above the surface of the ground. These grow and strengthen as the ear increases in size. They fit themselves to sustain the burden they are to bear. Now if you earth up five or six inches around the bottom of the stalk, then the brace roots put out as many inches from the bottom, and the part of the stalk between the brace roots and the other roots, (those that form when the corn begins to grow, and which are the mouths through which it takes in its food,) that part of the stalk being

buried in the earth become brittle, so that if the brace roots loose their hold when the winds are high, the stalk will snap just at the surface of the ground. When this has happened, no process of nature or art will repair the harm. Now the brace roots are more liable to lose their hold when they fix and grow in the comparatively dry and loose earth on the top of a high corn-hill, than when they take hold of the moister and firmer earth on a level surface, where the hill has been made. The roots themselves will do more towards supporting the corn in the latter case than in the former. And though it may be true that the part of the stalk below these, does, when surrounded by earth, help to prop the corn; yet though this help is afforded, the ability of the rooots are lessened; and if the roots fail, the corn *breaks* and is ruined, or nearly so. But when there is no hill, if the corn be tipped over, it yields at the very bottom; there is no breaking; the effect is an *uprooting* on one side; the roots on the other side retain their place and continue to throw their nourishment into the stalk, which though "cast down is not destroyed"—not broken—and in this situation the loosened brace roots, nourished through those feeding roots that are unmoved, find a way to get back into their former position, and put the stalk erect, to an extent that has often excited our wonder, and which no evidence but that of actual observation, could have proved to us. Led by curiosity on this point, we strolled through the corn fields, on as many as ten different farms, in the autumn of '39, subsequent to the blow which bore down all the corn, and we, noticing the effects in connection with every grade of hoeing, from the high hill to the flat surface, were satisfied that there was no advantage in *any raising* of the earth around the corn. Though where the surface was flat the mass of the corn on the field was in a more horizontal position, yet none of it was broken, and much fewer of the ears and stalks rested *on the ground.* Though all the stalks went far towards the ground, and an observer at a distance would think them in a bad position; yet upon passing through the field he would find them held by the roots from going quite down, and that in their oblique position they were doing quite well. Our crop that year was more than eighty bushels to the acre.

The result of all our observations is, that, excepting where you wish to hasten the maturity of the crop, *at the expense of its size,* which is often desirable in cold lands, there is no advantage whatever in making any hill, if the manure, (as it should be) has all been spread. Where manure has been put in the hill, of course, earth enough must be hoed on to keep it from drying up. The foregoing remarks are in part the reasons for our advice to farmers that they avoid hilling their corn. Stir the surface of the ground with the hoe as many times as you please—the more the better—but do not make hills.

It has become the custom to plough between the rows and hoe *immediately* after ploughing. This custom facilitates the hoeing, where a hill is to be made; but where the surface is to be kept level, it matters not in regard to the hoeing when the ploughing is done. Our opinion is in favor of the cultivator in preference to the plough; and we prefer the simple straight harrow teeth set in the cultivator frame, to the cultivator. Perhaps no evil results from stirring the earth deep between the rows at the first and second time of hoeing. We think it might *be well* to run the plough in the centre between the rows as deep as may be without disturbing the sod; but the earth thus turned up should not be put around the corn, but should be harrowed back into the place from which it was turned up. (This was done when our large crop was obtained in '34.) This would be stirring the earth well for the admission of light and air to the roots—an object very desirable. But neither the plough nor the cultivator should be brought *near* the corn after it is well started in its growth. These implements rend too many of the roots. A simple harrow, running lightly, and just breaking up the slight surface crust formed by the rains and dews, answer the one great purpose of letting in air and light, while it spares most of the roots. Our theory being, that one great object in the tillage of this crop is to keep passages always open for the admission of light and air, we have some objection to the use of the hoe *immediately* after the plough, cultivator or harrow. Suppose that one intends to work his land on which this crop grows, three times in the course of six weeks. Is it better to do *all*, both ploughing and hoeing, on the first and third weeks of June and the first one in July? or would you plough the first week, hoe the second, plough the third, hoe the fourth, plough the fifth and hoe the sixth? We recommend the latter; and for the reason that this course would keep *nearly all the time* a part of the surface crust so broken as to give free admission to air and light. Where ground is so furrowed or marked out as to admit of the horse's passing both ways, we prefer harrowing one way June 1st; the other way 5th; hoeing 10th; harrowing the same way as at first, 15th; the other way 20th; hoeing 25th; harrowing July 1st; harrowing 5th; hoeing 10th. This process which requires but little more labor than the common one, we have believed to be much more advantageous.

Our conjecture is that another routine, carrying us 15 days later, would be as serviceable as either of the preceding; but as we have no experience on this point, we call it only *conjecture*.

CORN SUCKERS—INQUIRY.

To the Editors of the Albany Cultivator:—I find that some of the best cultivators of our great crop, Indian corn, differ in opinion as to the propriety of pulling the sprouts or suckers from the growing crop; some contending that it adds to the crop to remove them, while others maintain they are useful. I should be pleased to learn your opinion.

L. H.

Ohio, April, 1841.

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We never remove the suckers from Indian corn, as we think the practice not warranted, either on the score of labor or productiveness. Some experiments, made a number of years since, convinced us that it was better to let them remain, and we have seen nothing since to induce a change of opinion.

In the first place, it is no inconsiderable labor to remove the suckers from twenty acres of corn, and when removed, they are usually lost to all economical purposes, when if suffered to remain, they form a large quantity of the very best of fodder.

In the second place, it seems that in many cases, the blossoms on the suckers are necessary to the perfection of the grain. The main stalks shoot up their stems, blossom, and shed their pollen or fructifying dust, all in the course of a few days, impregnating the principal ears through their silks, and then drying up. Now there is in every corn field many later ears set, which require the application of pollen, or no grains will be produced; and the blossoms from the suckers appear exactly adapted to this emergency.

It is possible a vigorous sucker may detract something from the size of the main stem, and perhaps diminish in some slight degree the ears growing upon it, but the additional ears gained always more than compensates these partial deficiencies, and leaves the additional fodder as a clear gain.

Since writing the foregoing, we have noticed the result of an experiment on this subject, communicated for the Southern Planter, which corroborates the opinion we have advanced above. The experiment was made in a field of thirty-five acres, and eight rows in a place were operated upon. The extract is from the journal of farm labor, &c., a book that should be kept on every farm:

"*August* 15.—I counted nineteen ears of corn upon eight hills of corn in one place, upon which the suckers had been left. On the same row adjoining, I counted sixteen ears upon eight hills, upon which the suckers had been taken away.

"In another place, I counted upon eight hills, nineteen ears upon the corn and suckers, and thirteen ears on the same row, on eight hills upon the stalks without.

"In another place, fifteen ears upon the stalks with suckers, and twelve on those without.

"The fodder on the eight rows throughout the field, must have been treble as much as upon any other eight rows in the same field.

"*November* 17.—Measured the corn taken from thirty-two hills, (four rows of eight hills each) upon which the suckers had been left, and thirty-two hills adjoining, (four rows of eight hills) from which the suckers had been taken away and the result was as follows:—The stalks with suckers made sixteen quarts and a half pint (of shelled corn) and the stalks without suckers made even sixteen quarts."

From a variety of similar experiments on record, it appears that in pulling the suckers from corn, the labor is worse than thrown away, and in respect to quantity of grain, fodder, and saving of labor, it is best to let them remain.—[*Ed. Albany Cultivator.*

DRAINING.

THE reasons for draining exist in the nature of the soil itself and that of the earths of which it is constituted. The object of draining is to free the soil from superabundant moisture, render it more permeable to atmospheric action, and thus give it friability and productiveness to a greater degree. Thorough draining is one of the greatest of modern improvements in agriculture, and has already redeemed millions of acres from a worthless state, and converted it into soil of the most valuable kind. Draining has been practiced from the earliest ages, but it was confined to freeing land from their surplus water, and beneficial as this must have been, it could be considered as nothing more than a preparatory step for further operations. A very large proportion of the cultivatable lands of all countries is based on a sub-soil more or less retentive of water, generally hard and tenacious, and allowing water to pass off very slowly, or by evaporation. If near the surface, or within eight or twelve inches, the effect on the crops grown is very injurious; if from twelve to thirty inches below the surface, the effect in the retention of the water is much less. To furnish additional means for the escape of water so retained, and which becoming stagnant is prejudicial to plants, is the object of the modern system of draining. In thorough draining the depth of the drains and their frequency must depend on the nature of the soil, and the quantity of water to be thrown off. The best method or rule appears to be to have them so placed that no water shall be permanently retained nearer the surface than thirty inches. Ditches or drains are dug at the requisite distances, so planned that the water shall flow freely to some given point of discharge, to the depth of from thirty inches to three feet, as circumstances

require; width at the top some eighteen inches, at the bottom ten or twelve. The filling up of the drains is performed variously. The most common is to place stones against the sides of the drain, at the bottom, and on these place others, so as to form a covering to an open space for the passage of the water. On these, others are thrown in loosely till the drain is filled a foot or more. On this, the turfs thrown out, are placed inverted, or else straw or turf must be below any depth that will be reached by the plough, or the covering of the drain will be disturbed, and the passage of the water obstructed. In some parts of England and Scotland, what are called draining tiles, are made of clay so constructed as to be placed at the bottom of the drain forming a permanent passage for the water, and when well made very durable. Land when thoroughly drained, speedily looses its tenacious hard-pan character, and becomes suitable for all kinds grain grown on the most favorable soils of the district; manures produce tneir proper action tee roots of plants have room to expand in search of food, and sour worthless lands are effectually cured. Open drains are important for carrying water from low lands on which it is apt to accumulate in quantity but are inadmissible on cultivated lands, as obstructing the plough. A large quantity of the richest land in all countries, exists in the shape of swamps and morasses, and draining, open or thorough, is fast bringing these into an available state. There are very few farms in the country on which draining would not be more or less useful, and on which it must sooner or later be employed.—*Albany Cultivator.*

BEST AGE OF THE HORSE.

Some difference of opinion appears to exist as to the time in which the horse is best fitted to perform labor, or rather respecting the age at which the horse intended for labor can be most profitably purchased. There is a general feeling in favor of young horses, and most individuals who wished a horse to perform hard work for five or six years, would choose one not more than four years old to begin with. We doubt whether this would be the best course, and imagine that one of seven years of age, will for five or six years do more work, and be more confidently relied on, than one younger. It is very true that where a farmer or other person is intending to keep or wear out his horse, one at four, may properly enough be chosen; but where five or six years of severe labor, without regard to other circumstances, is required, an older horse is unquestionably to be preferred.

A principal reason, and in our opinion a decisive one, for choosing a horse of greater age than four years, for severe work, is, that

at that age, the horse is immature, and of course unfit for great or long continued exertion. They have the life and the spirit, but the muscular energy is wanting. The bones have not acquired the hardiness, and the tendons the firmness, necessary to prolonged effort, and any action in which these elements are essential to success, must either end in a failure, or be accomplished at an injurious expenditure of physical energy and power. We may learn much respecting the capacity of animals for labor, from what we know of the effects of muscular exertion on ourselves. The man under twenty may be active and capable of a great effort, but he is wanting in the powers of endurance. There is not the firmness of muscle essential to severe and continued action. Taking the comparative ages to which man and the horse live, as a standard, and allowing that the man is incapable of his greatest and continued efforts, until he is twenty-five or past, the horse should certainly not be less than seven or eight, to answer the same conditions. Overtasking does not produce the same effect on the man as it does on the boy; and the horse at twelve, will scarcely feel fatigued at efforts which would have ruined him at the age of three or four. Light loads, short stages, and frequent stops while travelling, may enable a young horse to make a journey without injury; but where a heavy load is to be moved, or a quick pace is required, or on a farm a thick sward is to be turned, a horse under seven or eight should not be chosen; and at such severe work, the eight year old, will last longer than the four year old.

It is a saying among English sportsmen, that what is required for a first rate hunter; or a horse of great work, is young legs and an old mouth; that is, horses that have done little until five or six, and of course while their limbs are elastic, are at the same time in full muscular vigor. Elwes, the great miser, never allowed a colt to be broken until six years old; and when his horses were twenty or more years of age, his animals always led the field in the chase. Stage coach proprietors do not consider a horse past the most severe pace, or age, until after their sixteenth year. It must be admitted however, that much is depending on constitution and treatment, and when these are good, a horse lasts much longer than has been generally supposed. It is stated in an English journal, that at this time there is a surgeon near Finsbury Square, London, who has a grey mare upwards of forty years of age, which still does her work in admirable style. At thirty-six years of age, this animal performed the distance of eighty miles a day, on two successive days; and one hundred miles in one day, and without exhibiting any indications of being severely tasked. An extraordinary instance of what the horse can perform, is given in the New York Spirit of the Times of June 6th, from which it appears that the horse *Filo*, a six year old gelding, on the 12th of May, trotted between sun and sun,

one hundred and six miles, carrying 470 lbs. The match took place, near Boston.

We think we hazard little in the assertion, that while no animal is more deserving of attention to his improvement than the horse, there is none to which, among the mass of our farmers, so little attention is paid. It is enough, if the animal attached to the carriage or the plough is a horse; it matters but little what is his performance, or his bearing; and unfortunately, such as are unfit for the merest drudges, are selected to perpetuate the race. For our farm horses, we do not want the Arabian or the English blood horse: we require more weight, more bone and muscle, than these afford; but we do want some of their activity, and powers of endurance, and all these desirable qualities, it is believed, can be obtained by a proper selection, and by crossing. Some of the best horses in England, for the carriage or the farm, are the produce of a cross between the Cleveland bay, or the Suffolk Punch, and a half blood horse, combining the essential requisites of weight and action, as far as they can be united; and that a similar process here would be attended with the same beneficial results, does not admit of a question. Farmers should discard the caricatures of this noble animal, that disgrace their premises; in breeding, give a preference to *good*, rather than to *cheap* cattle; beware working their colts too young, or too severely; let the food correspond to the labor; and always remember that "*it is the pace that kills the horse;*" whatever may be his business, or his condition.—*Albany Cultivator.*

TREATMENT OF COWS BEFORE AND AFTER CALVING.

To the Editor of the New England Farmer:—In reply to questions of "A Herdsman," in the Farmer of the 28th of April, you have quoted from Youatt, some part of which deserves notice, as being wrong in practice.

He says it is "a cruel thing to separate the mother from the young so soon," but has not said how soon. Now, experience has taught me that the calf should be separated from the cow as soon as it has become dry, and taken what milk it needs for the time. The cow will bear the separation better than if it be permitted to remain with her longer: she will give down her milk better. It is the most effectual way that can be taken to make a cow hold up her milk, to let her calf remain with her day after day, as the manner of some is, she will give none, or little more milk than the calf can take, which will cause the bag to swell and get it in a bad state.

Giving "a pound of Epsom salts," as recommended by Youatt, is worse than useless, because every farmer, certainly every observing one, knows that the exertions of the cow in the act of bringing

forth, causes her to scour, the same as any other violent exercise to which she is not accustomed.

Some—particularly modern "gentlemen" farmers—suppose that a cow should be highly fed for some time before calving: this is their philosophy. Nothing can be more erroneous—or experience to me has been a poor teacher. My experience agrees exactly with that of "A farmer's Boy," in the Farmer of the 12th instant. When I was a boy, my father kept some cows, and they were full fed on the best of hay, (roots then not being the fashion,) for some week before calving:—His cows, most of them, had swollen bags, and more or less of them had to be doctored every spring. My practice for many years has been different. For about two weeks before calving, they are kept on hay of a little better quality than what they have had through the winter: they will not give so much milk at first, as when they have been kept high; but no matter; feed sparingly for a few days, increase the quantity and quality of the food, gradually, and the milk will increase; they will be better in my opinion through the season, than if fed high before calving. It is on the same principle that cows wintered on meadow hay till near calving, (I do not mean bog grass nor pollypod, but good meadow hay,) will do better; that is, will give a greater quantity of milk through the summer, than when wintered on English hay. I can produce an instance where the experiment was tried on the same cows. At one of the Agricultural meetings at the State House, last winter, Col. Jaques stated that he had known two instances of cows being spoiled for milk, by being fed highly with Indian meal. The fact I do not doubt: it is natural that it should be so. Indian meal is of a hot, drying quality and has a tendency to dry up the juices—the very thing to make milk. It is for the same reason, viz: its drying quality, that beef fattened wholly on Indian meal is not so juicy as that fattened on roots.—This may be to some a new and strange idea, and cause them to say if the writer is ever drowned, they must look up stream for him; but believed or not, it is nevertheless true.

A FARMER.

May 26th, 1841.

[*New-England Farmer.*

HORTICULTURE.

VEGETABLE GARDEN.

EGG-PLANT. *—Solanum Melongena.

Varieties.

Purple, for cooking. | White, for ornament.

Seed of the Purple Egg-plant may be sown in a hot-bed about the first of February, and the sashes kept down close until the plants come up, after which a little air may be given in the heat of the day.† Towards the middle of March, if settled warm weather, the plants should be set out from twenty-four to thirty inches apart, in a rich, warm piece of ground, and if kept clean, and a little earth be drawn up to their stems, hwen about a foot high, they will produce plenty of fruit.

Plants of the white variety may be raised in the same manner, and transplanted in March; or if some of the seed be sown in a warm situation the first week in March, these may come to perfection in the course of the summer. This variety, though generally cultivated for ornament, is good when cooked.

As Egg Plants will not grow in the open ground until settled warm weather, and are apt to perish from being transplanted too early, the gardener should be provided with small pots, in order that the plants may be transplanted therein early in March, and placed in a frame, there to remain until the first week in April, at which time if they are turned out, and planted, with the balls of earth entire, they will soon take root and grow freely.

Select the fruit when at matutity; cut it into slices, and parboil it in a stewpan; when softened, drain off the water; it may then be fried in batter made with wheaten flour and an egg, or in fresh butter with bread grated fine, seasoned before it is put in the pan, with pepper, salt, thyme, and such other herbs as may best suit the palate. Some use Marjoram, Summer Savory, Parsley, Onion, &c.

* This vegetable is known in the Charleston market as the Guinea Squash.

† Egg-Plant seed will not vegetate freely without substantial heat; but with proper management, upwards of four thousand plants may be raised from an ounce of seed. If these plants get the least chilled in progress of growth, they seldom recover; it is, therefore, important that the frame allotted for them be placed over a well-regulated hot-bed, and partitioned off, so that the sash can be kept down over the plants in cold weather.

Some Gardeners raise Egg-plants in the same frame with Cabbage and such other half hardy plants as require air every mild day; by such management, one or the other must suffer for want of suitable aliment—*Heat* being the principal food of tender plants, and *Air* that of the more hardy species.

HORSE-RADISH.—COCHLEARIA ARMORACIA.

THIS plant is propagated by cuttings from the root, either cut from the top about two inches long, or by offsets, or otherwise useless parts, from the sides of the main root, retaining the crowns or top shoots in as many parts as possible. These should be planted as early in the spring as practicable, in rows two feet apart, and six or eight inches from each other in the rows.

Select for the bed a good depth of soil, and such as will retain moisture, manure it with good rotten dung, plough or dig it deep, and with a drilling machine or other convenient implement, draw drills a foot apart—then plant with a dibble, cuttings as above described, in every alternate drill, from two to three inches deep. The intermediate drills may be planted with Beet or Carrot seed, or that of any other root, but Turnip Beets are the most suitable to cultivate between the rows, as they will grow quick, and can be pulled out, without disturbing the Horse Radish.

The beets must of course be thinned out while young, and kept cultivated by hoeing between the rows, which will also benefit the Horse-Radish. After the Beets are pulled, hoe the ground again, and keep it clear of weeds, by which method the bed may be cleared every year.

Some cultivate Horse-Radish in a permanent bed, in which case, if in taking up the roots some offsets be left in the ground, they will produce a successive supply for future years.

LEEK.—ALLIUM.

THE leek is a native of Switzerland, whence it was procured and distributed to other parts of Europe. It was cultivated in England, and particularly in Wales, as we read in history, at a very early period. The Welshmen still continue to wear leeks on their patron St. David's day, in commemoration of a victory which they obtained over the Saxons in the sixth century, and which they attribute to the leeks they wore by order of St. David, to distinguish themselves in the battle.

Leeks are a wholesome, and certainly a nutritious vegetable, and from their mild qualities, are preferred by many families for their soups, to onions.

There are two varieties of this plant at present under cultivation.

1. The Narrow-leaved, nearly superseded (except in some countries) by the next, which is far superior to it.

2. Broad-leaved or London Leek, so called from the preference given to it in the London markets, which it highly deserves. It

was first obtained by a gardener in Essex many years ago. A gentleman from the West Indies having observed a plantation of leeks near London, told the author it put him in mind of the young sugar canes in that country, to which he said they bore a great similitude.

Culture.—The soil in which the leek is planted should be the best the kitchen garden affords, and previously well manured and worked up, a full spade in depth. In any open spot of light rich ground, the first or second week in February, the seed should be sown rather thinly; otherwise the plants will come up in clusters, and require to be thinned out. After the seed is sown it should be beaten in with the head of a rake, and the bed afterwards regularly, but lightly raked. An ounce of seed will produce a great number of plants. When grown to six or eight inches high, they will be of sufficient size to plant out; for which purpose a good piece of ground should be chosen, in which, after being well broke up a full spade in depth, deep drills must be drawn to receive the plants; if more than one row, a foot apart. When ready, the plants are to be taken up from the seed bed, and after their tops and roots are moderately shortened, planted (first giving their root a gentle twist in the drill) about nine inches asunder. If the ground or weather is dry, a little water will be necessary. When the plants are observed to be in a growing state, the ground should be hoed and levelled round them: by frequent hoeing and keeping the ground clear of weeds, they will attain a useful mature size early in autumn. On the approach of hard weather a parcel may be taken up and laid under cover in dry sand, for winter use.

LETTUCE—Lactuca.

The lettuce may be said to be a native of the four quarters of the world, but the finest was originally procured from Egypt, Aleppo, and the island of Cos, belonging to the Turks. From that island our finest lettuce, Cos, takes its name, as do all others of upright growth, whether they come from that country or any other.

The following sorts have been cultivated by the author, which he presumes to say are not exceeded by any of the present day:—

First, the Cos, being of an upright growth.

1. White Cos. } Both excellent for the main crop in summer.
2. Green do. }

3. Green or Egyptian Cos (black seed,) a lettuce of the greatest utility in dry seasons. Not being apt to run to seed like the two former, it should therefore always be sown either with one or both of them; it is of a hardy nature, and stands the winter nearly as well as the next variety.

4. Brown or Bath Cos, a good hardy lettuce to stand the winter in the open ground. There are two varieties, the dwarf and tall;

the dwarf is the best; and hearts much better and sooner than the other, and is less apt to run to seed in a dry season.

5. Brighton Cos. This lettuce was strongly recommended to the author by Mr. W. Rogers, who considers it of first rate quality and form. From the specimens which the author has seen of it, he pronounces it excellent.

6. Florence Cos, very large and fine when well turned up, which, however, takes a long time to accomplish. It has a peculiarly pleasant crisp taste, and from its lateness will be found a most useful lettuce, when others are running fast to seed. It requires a strong, light, rich, sandy soil, as its growth is but indifferent, though it be frequently watered.

7. Spotted or Aleppo Cos. This lettuce, in moist seasons, and planted in a strong rich soil, will be tolerably fine, and a few may be planted for a change and succession. In light soils and dry summers it runs too quickly to seed, before being properly cabbaged.

8. Brown Silicea.
9. White Silicea.

} These two varieties of lettuce are esteemed the best for stewing, particularly the white; they are rather too coarse for salads.

There are three other sorts of Cos lettuce in cultivation; the Paris, Golden, and Dwarf Siberian, all very good, and can be planted occasionally as extra crops for the sake of variety, succession, &c.

The following are such as are generally called cabbage lettuce, being more or less of a flat surface.

10. Brown Dutch,—a well-known lettuce, hardy, and resists the severity of the winter; it is almost equal to the Hammersmith variety. There is another variety with yellow seed, of late introduction; it is a good lettuce, and, in crispness, superior to the brown.

11. Imperial Cabbage Lettuce,
12. Grand Admirable Lettuce.

} Two of the finest cabbage lettuces we have for salads during the summer months. They heart well, and continue longer in use than any other of the cabbage lettuce varieties.

13. Large White Cabbage Lettuce,—serviceable; turns in well, and withstands the drought of summer, as well as the best of these varieties.

14. Marseilles,—similar in properties to the Florence, requires a strong rich soil.

15. Malta. The seed of this sort was given to the author by a gentleman from that island. It produces uncommonly large heads, rather of a rambling nature, but the blanched parts are crisp, and of a pleasant taste; it has not that bitterness which others are liable to. To have this lettuce in perfection in the early part of summer, it should be sown on a slight heat in the beginning of March, and

afterwards transplanted in a cool rich spot of ground, at full eighteen inches apart.

16. Dutch Forcing Cabbage Lettuce (rather scarce.)

There are also the Tennis-ball, Large Mogul, and Drum-head cabbage lettuces, all good tried sorts, and in general estimation for culinary purposes.

17. Hammersmith Hardy Green. An old inhabitant, and a most useful lettuce.

Culture.—Many other varieties could be added to the above list, which however embraces a sufficient number of well known ones. In the south, our principal crops of Lettuce are grown in autumn. These *usually* pass through the winter unharmed by the weather, and thus supply the table during the whole of that period. In the spring successional crops are sown but these can only be sown in the early part of the season, as they are impatient of heat and soon run to seed. The seeds of the first crop should be sown the last of August, and successional crops may be every month thereafter, until the month of March, after which time, there is no chance of obtaining any good heads, at least not on the sea-board. The seed should be sown on small beds prepared for them, and but lightly covered. As soon as they are fit to transplant-out, let beds be prepared highly manured and well pulverised, on which plant them at the distance of from nine to fourteen inches apart, according to the variety you may have sown. They should be hoed once in every week or fourteen days. Those sown in the spring should be sown on the bed where they are to remain, and not be transplanted out, as they are more liable to run to seed when transplanted than when left to head where originally sown. These should be thinned out as soon as large enough and not be permitted to draw each other up. A piece of low ground *well drained*, is the most appropriate location for them in spring and summer, but a drier one during the autumn and winter.

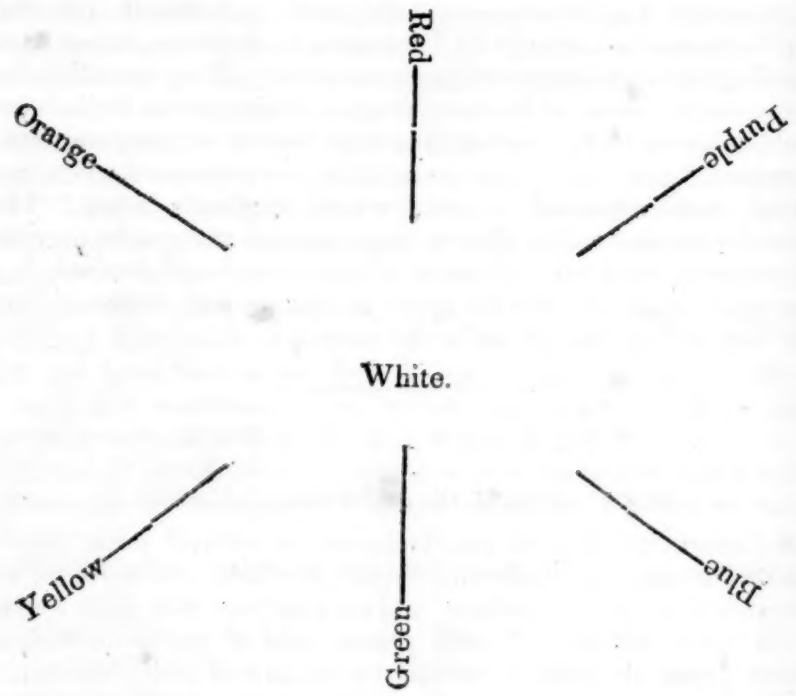
THE FLOWER GARDEN.

ARRANGEMENT OF FLOWERING PLANTS.

In a recent number of the Gazette we offered some observations on turning out flowering plants into beds and borders, with reference to soil and exposure; and we shall now add some remarks on the arrangements of such plants, and of plants in beds and borders generally, with a view to the colours of their flowers.

All scientific directions respecting the arrangement of colours are founded on a law of nature, the truth of which every one can prove for himself, viz., that every colour has what is called its complimentary colour, and which complimentary colour, when placed adjoining it, affords most satisfaction to the eye, or, in the language

of artists, contrasts better with it than does any other colour whatever. To discover what colour is complimentary to any other colour, take a piece of white paper, say a page of letter paper, and place on the middle of it a round blotch or patch (a coloured wafer for example,) of black, and also of the colour of which you wish to find the complimentary one. Then fix the eye intently on the patch of black for a few seconds, and afterwards for a few seconds on that colour for which you wish to find the complimentary one; and on the white paper round the latter colour, and close to it will be seen a faint shade of the complimentary colour. Suppose the circular patch to have been blue, then you will find it surrounded with a narrow zone of orange, which colour is therefore the complimentary one of blue, or that which pleases best when placed beside it; or, in other words, contrasts best with it. In like manner red is the complimentary colour of green, and yellow of purple. If we imagine the six primitive colours, together with white, which for gardening purposes, is to be considered as a colour, placed as below, we shall form a source from which rules can be drawn for the arrangement of colours in every case that can occur in the practice of gardening.



In this diagram, or formula, white is placed in the centre, because it forms a suitable contrast with every other colour, becoming in fact, to a certain extent, the complimentary colour of whatever colour may be placed adjoining it. Supposing you have a flower of

any particular colour, and wish to know what other flour will best contrast with it, then look in the diagram for the colour which comes nearest to that of the flower of your plant. Suppose it to be straw colour, then yellow being the nearest colour, look opposite to it, and you will find purple, which is its complimentary or contrasting colour. In like manner blue will be found opposite to orange, which two colours assort better to-gether than with any others, and so on; white being in the centre, and as before mentioned, assorting with all.

As far as mere colour is concerned therefore, colours may be placed in any order of succession, provided white is introduced between every two colours. If white is not introduced, then the order may be any variation which the planter chooses of blue and orange, purple and yellow, and red and green, or any of the shades of these colours; but green being the colour of foliage, it goes for nothing in the arrangement of living flowers, and therefore white must be used as a substitute for it.

Thus far as to the harmony of colours seen in succession along a border of miscellaneous flowers, or in a row of one kind of flower, such as the Dahlia or the Pansy, of which there are several colours. But in many cases, another source of beauty is required in the arrangement of colours, even in a line, or in a border—that source is regularity, or the repetition of the same colours at fixed intervals. There are various reasons why regularity in form or colour, as in the succession of sounds, is satisfactory to the human mind; but the principal one is, that it affords decided evidence of design or art on the part of man.

The arrangement of colours in rows and in borders, whether made judiciously or injudiciously, produces little effect on the eye of the spectator, compared with a good or bad arrangement of colours in masses; whether in one large bed of miscellaneous flowers, or in a flower garden consisting of a number of beds grouped together, so as to form a whole. If the colours do not unite in forming a whole, as well as the beds, the result will be unsatisfactory.

Not to perplex the reader with too many reasons and details, we shall briefly observe, that the two principal points in arranging colours in mass in a flower garden successfully, are symmetry, and the preference of warm to cold colours. Warm colours are red, orange, and yellow; while green, blue and purple are cold colours. Green, therefore, being a cold colour, and forming a large proportion of the surface of most flower gardens, it is not desirable to increase it, or to introduce either blue or purple flowers with it to any great extent. Every bed in a symmetrical flower garden, except the one which forms the centre, must have a corresponding bed, resembling it in colour as well as in form and position. If the space between the beds are of grass, then red, yellow, and orange,

or shades or compounds of these colours ought to prevail; but if the intervals between the beds are of yellow gravel, then blue, purple, and white, with their different shades and variegations, ought to be most abundant, because these, being cold colours, contrast best with the yellow, or yellowish-brown of gravel, which is a warm colour.

Principles, which are applicable to the use of colours in the arts and manufactures, and even in landscape and flower painting, will in many cases, not apply in gardening, from the large proportion of green in some cases, and of dug soil and gravel-walks in others, which are continually present; but the following rules if attended to, will prevent any gross violation of propriety:—

1. In all borders of uniform width, that are planted with miscellaneous flowers, let the white flowers bear a considerable proportion: equalize the mixture as much as possible throughout, and see that the same plants and the same colours, or plants and colours as nearly resembling one another as possible, recur at regular distances.

2. In borders irregular in width and in direction, the disposition of the colours may be irregular also; but still to preserve harmony and produce force of effect, white flowers should be interspersed throughout.

3. In all merely regular flower-gardens, by which we mean gardens consisting of a repetition of one or more forms at regular distances without any centre, the colours should be repeated in the same manner as the beds; thus suppose a square spot laid out in twelve parallel beds, all of the same length and width, with grass paths between them; then the colours may be—1, red; 2, white; 3, yellow; 4, purple; 5, orange; 6, blue; 7, red; 8, white; 9, yellow; 10, purple; 11, orange; and 12, blue.

4. In all symmetrical flower gardens, by which is meant such as have a centre, or centres; in other words, an axis or axes of symmetry, arrange the colours symmetrically. "Let one half the platform just reflect the other." Where the spaces between the beds are in turf, use chiefly warm colours, such as yellow, orange, and red, with their shades; but where the space between the beds are of gravel, or paved, use a large proportion of cold colours, such as blue, purple, and white.

[*Gardener's Gazette.*

MONOGRAPHY OF THE GENUS CAMELLIA, OR AN ESSAY ON ITS CULTURE, DESCRIPTION AND CLASSIFICATION;

BY THE ABBE BERLESE.

Translated from the French for the Horticultural Register, by Henry S. Dearborn.

[Continued from page 272.]

CHAPTER SECOND.

SEC. I.—THE CULTIVATION OF THE CAMELLIA.

THE Camellia of Japan is, incontestably, one of the most beautiful conquests, which horticulture has achieved during the last century. The magnificent form and appearance of this shrub, the rare elegance of its foliage, the beauty and size of the flowers, the season in which they appear; their variety, their abundance and their duration, are qualities which no other vegetable possesses, in such an eminent degree, and which assign it a distinguished rank, among the most admired plants, that are selected, for augmenting our pleasure and gratifying our taste in floriculture. But all these advantages are yet, very far from being generally appreciated, notwithstanding this plant is every where received, by admirers without number; still it is much to be regretted, by enlightened horticulturists, that it is not more extended, more zeal evinced for its acquisition, and above all, better cultivated.

We daily hear, even well informed persons, observe, that the Camellia is a very difficult plant to manage, and that it is too dear; or that it requires green-houses, especially appropriated to it, and that it is very expensive to preserve them; while others abandon them because they have not a sufficient extent of ground for their accommodation, or a gardener sufficiently well educated to superintend their cultivation; and finally, many of those, who undertake their culture, soon give it up, because they do not succeed in making them bloom freely, and in the most perfect manner.

Devoted, for twenty years to the special culture of the Camellia, we are emboldened by the experience acquired, during that long lapse of time, to attempt the removal of all these enumerated difficulties, by describing, as far as our feeble abilities will permit, the manner in which this plant can be easily cultivated, preserved, multiplied, and made to bloom annually.

Although the Camellia is a shrub of a rustic nature, and does not require an elevated temperature, nor an extraordinary rich soil for its vegetation; although it can accommodate itself to all expositions; still it is better to be sheltered; and notwithstanding it can endure considerable cold, without perishing, yet, to enable it to acquire a vigorous vegetation, and blossom abundantly every year,

as well as to subject it, with success, to the various modes of multiplication, there are the following principal conditions, which are essential; in the first place, the soil in which it is to be cultivated, and which is, generally loam, vegetable mould or peat; but there is some difficulty in the choice of the composts and the mode of admixture; and for the benefit of the horticulturist, we shall extend our remarks on this subject, which is so very important to the successful results of their labors. By a good soil, we mean that mould or peat soil, which contains the largest portion of decayed vegetable and animal matter. It should be light, sandy, does not soil the fingers, and is of a chestnut brown, or deep fawn color. Such, in particular, are those of Sanois and Meudon, in the environs of Paris, as will be perceived by the following analysis:

Peat Soil of Meudon.

Siliceous sand,	62 00
Vegetable matter,	20 00
Earth,	16 00
Carbonate of lime,	0 80
Soluble matter,	1 20
	100 00

Peat Soil of Sanois.

Silex,	43 80
Lime, carbonate,	7 10
Salts, diliquesent,	1 10
Earth,	31 70
Iron, magnetic,	0 13
Matter not yet decomposed,	13 25
Loss of apparent foreign substances,	2 92
	100 00

The portions not decomposed or deliquescent salts, have yielded by an exact analysis,

Silex,	2 00
Carbonate of Lime,	15 00
Sulphate of lime,	10 00
Muriate of lime and magnesia,	8 00
Animal matter,	12 00
Loss and water,	53 00
	100 00

The mould or peat soil of Palaiseau, Beauregard, Longjumeau, Vincennes, &c., is rejected, as too light, and as containing less earth than the others. The two preceding are preferred, and especially that of Chapellen-Serval, which being richer in earth,

they preserve for a longer time their fertilizing qualities, and are less subject to loss by rains and irrigations. The most objectionable is that of Fontainebleau, which is taken from low and marshy places, and whose color is of a dull and faded black, which indicates sufficiently the presence of turf, and renders this soil so compact and hard, that it is difficult for the roots of delicate plants to penetrate it. There is a still greater inconvenience, arising from its turfy nature, for when dry it becomes so hard that it is impermeable to water. *

When a selection has been made, of one of the varieties of peat, which have been named, as the most suitable to the nature of the beautiful plant, which engages our attention, it should be cut into little pieces, about three inches square, and exposed to a free circulation of air, in a shaded position. The preference given to this substance arises from its being light, substantial, and the length of time it retains in nourishing qualities. It is easily permeable to water, when it has not been dried too much, absorbs and retains a sufficient quantity of aqueous particles, admits of a free ramification of the roots, readily absorbs the atmospheric gasses, and finally, remains for a long time endowed with the principle of fermentation, according to the quantity of subterranean gass disengaged, and the dissolution of the carbonic acid, so essential to vegetation.

We shall not speak of the peats of Gand, Turens, Anvers and Bruxelles, which are of a fawn color; they are the best of all those with which we are acquainted.

When natural peat soil cannot be procured, a substitute to a certain extent, can be factitiously formed, which answers very well, and to which we give the name of compost, in conformity to the practice in England, where various kinds are so ably prepared.

Take natural rich and substantial loam, from pastures, or grass fields, with the turf, light mellow virgin soil from the forest, with all the roots and herbaceous plants with which it is covered, and rotten leaves; mix these well together in equal parts, and form a conical heap so that the rain water may easily run off; this pile of compost is left in the open air, often dug over and repiled up, so as to be operated upon by the atmospheric gases which surround it, and a kind of fermentation, until it becomes a homogeneous mass, which requires nearly a year, when it is fit for use, and affords an excellent equivalent for natural peat soil.

In England, where proper peat soil is rare, some of the ablest cultivators, such as the Loddiges, Swet, and Young, rear Camellias in a mellow natural loam, filled with vegetable substances, in a state of decomposition, mixed with a certain quantity of turf and fine sand; others, as Bayswater, employ a mixture of turf, naturally

* The soil of the Cooper River Rice fields has been found admirably adapted to the culture of the Camellia. [Ed. So. Agr.

sandy soil, and a certain quantity of very old barn manure, reduced to an earthy state; and there are some, as in the case with Mr. Henderson, a Scotch cultivator, who is very celebrated for his splendid collection of Camellias, makes use of a compost formed of light loam, fine river sand, and thoroughly decomposed leaves.

In Italy they use soil taken from the forest, mixed with decomposed leaves.

In those parts of Germany where peat soil cannot be procured, it is replaced by a compost, formed of one third turf and two thirds of virgin earth, that is a little sandy, but well filled with decayed vegetable matter.

But whatever soil or compost is used, for the Camellia, it is necessary that it should be well pulverised and cleared of all stones, shells and pieces of wood; but if it is natural peat soil, take care not to imitate those unskilful and ignorant gardeners, who pass it carefully through a seive, by which inappropriate operation, it is deprived of a quantity of small roots, and other vegetable substances, which by gradually decaying, furnish for a long time, successively prepared new aliment for the plants.

Before using peat soil, for re-potting, it is best to break up the large lumps with a mallet, or which is still better a little flail, for the purpose of separating and removing the strong roots and stones; it is then passed through a coarse hurdle, or the little lumps may be pulverised, by rubbing them with the fingers. The soil thus prepared is immediately used. Only the earth or compost which is to be employed, for seeds, cuttings and layers should be passed through a seive.

SEC. 2.—REPOTTING.

The spring is the most favorable season for repotting the Camellia. This operation should be performed immediately after florescence, and before the sap begins to be in activity, which is generally towards the end of March. It may be done, however, in the autumn, or even between the two periods of the flow of sap, which is in June or July. This process is performed by removing the shrubs into pots about an inch deeper, and broader, than those in which they have been growing. The time for doing it, is when the ball of earth, which surrounds the roots, is a little dry. As much of the old earth should be removed, as possible by the fingers. All the dead and wounded roots should be carefully extirpated. As it is very essential, to the future health of the plant, that the water which is used in irrigation, should rapidly flow off, it is necessary that the bottom should be filled with little pieces of broken pots, or what is better, a quantity of coarse sand or gravel, which prevents the water from remaining too long. We have been in the habit of scattering, very lightly, quick lime, over the pile of peat soil, or compost, which we use for repotting, as long experience

has proved to us, that this mineral body, prudently employed, gives a remarkable activity to the vegetable qualities of the soil, with which it is incorporated.

We do not insist on the dimensions of the pots, which should be used for the Camellia, as that is an affair of taste and experience; but we should deny as an unwarrantable assertion which is often repeated, that small pots are best. Some horticulturists pretend, that to make this plant flourish well, the roots should be restrained by a small pot; but the persons who practice this method, have fallen into an error, which it is easy to refute, from the greater number and success of those, who cultivate the Camellia in large pots, boxes, and even the unconfined earth. There are two reasons which induce our nursery men to raise the Camellia in small pots: first, because they occupy less space in the green-house, do not require so much compost to re-pot them, and they are more easily handled; and secondly, being often obliged to confide the watering of the plants, to inexperienced and careless persons, they pour on the water without discretion, which occasions great losses, as the large pots retain the humidity, much longer than the small, which has the same effect upon the plants, as too great a quantity of aliment upon the human body, and produces a true indigestion, which immediately kills the Camellia, after having produced disease in the roots, from being long immersed in that humidity, which they are no longer capable of absorbing. But, as with a little skill, all these inconveniences can be obviated, there cannot be a doubt, that the Camellia will succeed better in large pots, where the roots can easily extend themselves, than in those of small size, in which they are confined and compelled to be folded over, and entangled with each other.

As soon as the Camellia has been re-potted, it should be abundantly watered and returned to the green-house, whenever this operation takes place immediately after the period of florescence; and the temperature should be from fifty to sixty degrees during the day, and from fifty to fifty-four during the night; but at other times it will be sufficient to place it in the shade for a few days, after it has been watered. The increased warmth of the green-house, at this period, causes the plants to throw out long and slender roots, and as the heat of the sun increases daily in its intensity, it is indispensable, that the green house should be covered with linen or cotton cloths, or thin mats, during the time the rays of the sun fall upon the glass; for without this precautiou, the young shoots and leaves would be scorched and spotted.

Sec. 3.—IRRIGATION, AND THE KIND OF WATER MOST PROPER FOR THAT OPERATION.

It is a principle in horticulture, that exotic plants, with persistent leaves, and which, in our green-houses are in almost a constant and more or less active state of vegetation, according to the tempera-

ture of the air, require, even in winter, a certain degree of humidity, sufficient to afford aliment to the leaves and roots. This is not the case with exotic plants, which have caducous leaves; these plants during the time they are in repose, scarcely require any water. The Camellia being a plant with persistent leaves, likes almost a constant humidity, and especially in summer. Frequent waterings during the hot season, powerfully contribute, to re-animate and sustain its beautiful appearance. But the second effort of vegetation having terminated, when the new wood is almost matured, which is generally the case by the middle of August, and the buds are formed then, until the period of the next florescence, the distribution of the water becomes difficult and requires great attention; for the health of the plant chiefly depends upon the care with which it is done. Too little, or not enough humidity, has the like injurious effects. The roots either become dry or rot, the whole plant languishes, the leaves, buds and flowers fall off, and finally it dies. The first consideration, then, is the knowledge of adopting the proper mean between humidity and dryness, especially during the period that the Camillia remains in the green-house.

But what then, is this proper mean which is most congenial to the Camillia? What is the quantity of water which it requires? At what hour of the day should it be given? What kind of water is best? All these questions are of great importance, but easily resolved. We have said that, generally, the Camellia likes almost a constant humidity; but still there should not be given, a great quantity of water at a time; it is only essential to repeat the watering often, in order to keep the earth always in that state of humidity which is sufficient to maintain the fermentation, but by no means so great, as to prevent it; which would inevitably be the case, if the water is too copiously supplied. As to the hours of the day, which are the most favorable for watering the Camellia, we can only say, they must depend on the seasons, and especially on the temperature of the external air. In the winter, whether the pale and feeble rays of the sun appear to gladden the sad and dreary aspect of nature, or that she is long deprived of them, as is most common, it is necessary during those short and cold days, to water this plant, between nine and ten o'clock in the morning, in order that the earth may have time to regain its heat, by permitting the evaporation of a portion of its humidity. If the Camellia is watered in the evening, the coolness of the night joined to that of the water, arrests the progress of the sap, and there being no evaporation, the fall of the buds is the inevitable consequence of such an untimely operation. In the summer on the contrary, when the Camellia is in the open air, it should be watered in the evening, because the water contributes to maintain the coolness of the earth during the night, and the plant bathed in this conjenial humidity, recovers from the absorbing effects of the ardent heat of the day.

It is not sufficient, however, to moisten the roots of the Camellia. When the temperature of the green-house rises too high, which often happens during the months of May and June,—for our advice is, to leave the Camellia in the green-house until the end of June,—* the leaves of this plant require, that the salutary humidity in which they delight, should be given to them at that time, when they are exposed, in the shade to the open air. A syringe or hand-pump is made use of, to cause the water to fall upon the leaves of the Camellia in fine drops like a gentle shower of rain. The water should be of a medium temperature. This mode of watering which is so beneficial to the Camellia, when it is in the green-house, in the latter part of the spring, is still more so, if it is frequently done in summer, when this shrub is exposed to the open air. We think it also very beneficial at this time to water the surrounding ground on which the plants stands, to restore to the air a part of its elasticity, and to the plants those vapors from which they derive their ærial nutriment.

But although the waterings properly attended to, have a favorable effect on the vigor of the Camellia, yet if they are too long neglected, the contrary result is produced from the aridity of the earth in the pots, which is the consequence of such omissions. A too great dryness of the earth, attacks this shrub in its roots, and when that is the case, there are no means of arresting the evil. Peat earth, on becoming dry, is incapable of absorbing water, or if it permits its passage, it is only in the form of an infiltration, and does not take place except when the water meets no obstacle and passes through the pot, without refreshing the roots of the perishing plant. The Camellia, when the waterings have been long neglected, does not exhibit any symptoms of suffering, but is soon dispoiled of its leaves; the wood becomes shrivelled and stunted, the buds fall off, and death speedily follows.

To restore the Camellia the life, when this evil is not incurable, it is necessary immediately to repot it, giving to it fresh earth, cutting it down short, and placing it under glass in a hot-bed moderately hot, depriving it of the air and sun, and watering it very moderately and only by degrees; above all, do not soak the plant, with the ball of earth on it, in water, as is the practice with some gardeners; this sudden transition is very injurious, and will complete that destruction which the dryness of the earth had commenced. Another mode of saving the plant, is to put it in the open ground, under the protection of glass, where it more promptly acquires its primitive vigor.

The waters of fountains and wells, when they are selenitical or calcarious, and even those of rivers, as they are often charged in their course with various salts, are all injurious to the vegetation of

* It must be recollected that this is in the neighborhood of Paris.—Ed. So. Agr.

the Camellia; and if any of them are used, they should previously remain exposed to the action of the sun for at least twenty-four hours. Rain water is preferable, and has a salutary influence on the health of the Camellia. Not being saturated with any of the saline principles, possesses the property of easily dissolving those salts which are contained in the earth in which the plant is placed, and are of the character which penetrate its tissue.

But the best waters for the Camellia, are those of swamps, morasses and bogs, which have been continually exposed to the influence of the sun and air. These waters containing, in abundance, the principles of nutrition, especially when they are found mixed with the detritus of vegetable and animal bodies, which furnish a certain quantity of carbon and azote, act in a wonderful manner upon the voracious organs of the Camellia; but these waters should only be employed in the summer, when the shrub is exposed to the open air. In winter, and when the plants are in the green-house, they should be moistened with pure water, which has remained for several days in a cistern, situated in a corner of the green-house.

ON THE PROPAGATION, CULTIVATION, AND GENERAL TREATMENT OF PELARGONIUMS, (GERANIUMS.)

THE Pelargonium is a native of the Cape of Good Hope, and very few species of the genus have been discovered elsewhere.—They are generally found growing on the open plains, which they beautify during the flowering season by their endless diversity of colors. In the cultivation of the plants, it should be the purpose of the grower to imitate, as near as possible, the temperature of their native climate. During part of the year, when the rainy season commences, the flowers burst forth, revealing their brilliant and various-hued petals, and clothing the plains as with a carpet, composed of all the tints of the vegetable kingdom: this lasts for many weeks: then succeeds the dry season, when the plants, from want of sufficient moisture, undergo a state of repose; for, though they continue to grow, they do so slowly, acquiring thereby renewed strength, which prepares them for a strong and vigorous bloom.—In the artificial cultivation of the plants, it should be impressed upon the grower to imitate, as nearly as possible, such a climate. It is from the want of the knowledge of this simple fact, that most cultivators do not grow their plants more successfully; but, quite contrary to the most natural practice, they keep them continually excited, and supplied with moisture, until they become—instead of dwarf, compact, and rugged plants, profusely laden with blossoms—mere masses of huge foliage, with a few scattered and straggling trusses of flowers.

With these preliminary remarks, we come to the cultivation of the plants; and for convenience, as well as for the plainer instruction of our readers, we shall divide the subject as follows:—Propagation of the Plants—Treatment in the House—General Treatment when out of doors—Soil—Water—Re-potting the plants—Destruction of Insects.

PROPAGATION OF THE PLANTS.

Geraniums, or, properly speaking, palargoniums, are grown both from the seed and from cuttings. The former method is only adopted for the multiplication of new varieties, and the latter to propagate and perpetuate them. The method of growing them from the seeds is very simple, as they generally vegetate freely and bloom the second season. The production of new kinds from seed has not been often attempted in this country, though there have been some few very fine varieties originated. Mr. Buist, of Philadelphia, and Mr. Hogg, of New York, have probably grown more than other cultivators. Mr. Donald, now of the Public Garden, has also raised some very pretty ones, a few of which are now, (May 15th,) in flower. The seeds only require to be sown in light rich soil, and placed in a green-house or frame, where they will soon vegetate; when an inch high, pot them off into the smallest sized pots, and continue to treat them as will be described for cuttings.—Cuttings of geraniums may be put in at any season of the year, but there are certain periods when they do better than at others.—When the plants are grown in a house by themselves, or where there is a large collection, and a succession of flowers is wanted the whole season, cuttings should be put in at three different periods. The first in June, the second in August, and the third in October; the first will commence blooming in March, the second in May, and the last in July; thus keeping up a period of blooming from March till September.

The cuttings should be from five to six inches long, and contain about four joints, directly underneath the lower one of which it must be cut across smoothly with a sharp knife; take the leaves off from that part which is put into the earth; but the remainder of the foliage should be left entire, and not shortened in the least, unless it be cut off a decayed or yellow leaf. When the cuttings are all prepared, take as many *thumb* pots as there are cuttings; fill them with a compost, first putting some drainage at the bottom, of decomposed leaves and sand, mixed in the proportion of one-third of the latter. Put in each cutting in the centre of the pot, about one inch deep, pressing the soil firmly down and around the cutting; finish the operation with a gentle watering, and place the pots in a declining hot-bed, or, if one is not at hand, under a hand-glass. If neither are to be had, and the number of the cuttings small, place them in a warm situation, where they should be

shaded from the sun until they have struck root; pick off all decayed leaves, keep the frames close, and give water in small quantities. At the end of a month or six weeks they will be sufficiently rooted to pot off in No. 2 pots, in a soil prepared as hereafter to be noticed. Place the plants where they will have plenty of light and air, until they are removed to the green-house, or the parlour, for the winter. Allow them to remain out as long as there is no danger of frost. At whatever period the cuttings are put in, either in June, August, or October, they should be shifted into No. 2 pots as soon as they are well rooted.

TREATMENT IN THE HOUSE.

By the first of October at the latest, and, perhaps, previously, if the nights are cool, the plants should be removed to their winter quarters. If in the green-house, they should be placed in situations *as near the glass as possible.* With a strict adherence to this rule lies the great secret of growing geraniums; the plants, if placed far from the glass, and out of the reach of the air, draw up weakly, and soon become straggling and uncouth-looking objects, fit only to stand among a mass, but possessing no beauty as single specimens. If the stage is at some distance from the glass, and in a house with other plants, an extra shelf should be put up on purpose to raise the plants close to the glass. During October and November, they will make considerable growth, and at that time the main shoot should be topped to make it throw out lateral branches. All geraniums have a tendency to run up, and, unless this is checked early the plants are almost ruined for another season. The plants should not be arranged too near together. Water sparingly during November and December; pick off all yellow leaves, and if any insects appear, destroy them as will be directed.

In February, most or all of the cuttings put in in June, will show flower buds: as soon as these are discovered, they should be repotted into No. 3 pots; give liberal supplies of water until the bloom is over. The plants should be slightly shaded during the hottest part of the day when in full bloom, and the beauty of the flowers will be retained for a much longer time than if they had not been protected.

GENERAL TREATMENT OUT OF DOORS.

Early in June the plants should be removed to the open air, in order that the young wood may harden; place them in a half shady situation at first, as a powerful sun might injure them by being too suddenly exposed. About the middle, and from that to the last of the month, the plants should be cut down to within six or eight inches of the pot, and the cuttings taken off for a new stock; the old plants may be then thrown away, or, if desirable, they can be retained for cultivation; but as young plants are, in our estimation

preferable to the old ones, they need not be retained: when only a few cuttings are wanted, these may be taken off and the plants turned into the border, where they will bloom during the summer. Such of the old plants as are retained, should, as soon as the new shoots are an inch or two long, be exposed to the full influence of the sun and air. Keep the plants well watered; let them be arranged neatly together, and set upon a bed of coal ashes, to keep the worms from entering the pots.

SOIL.

Pelargoniums, or, properly speaking, geraniums, delight in a good rich soil, not too light; when young it should be rather sandy, with a portion of rotten leaves; but when the plants are shifted into their blooming pots, a compost of good rich light loam and well-rotted manure, in equal quantities, is best suited to the production of strong plants and fine flowers—give the pots a good drainage with broken potsherds. Bone-dust and other strong manures have been tried, but only in a cautious manner, and then without any beneficial effects.

WATER.

We have already remarked that the plants should be sparingly watered in winter; in no instance should large quantities be given until the plants begin to show their flower buds, after which time there is no danger of their being over-watered. The syringe need not be resorted to on any occasion of their growth, unless it be to wash off the dust from the leaves, should the plants stand where they were liable to get dusted. In winter there is no necessity for it, and if often used when the plants are in bloom, the flowers are soiled and damaged so as to disfigure the trusses. At the root however, give water freely, without any fear of endangering the health of the plants.

RE-POTTING THE PLANTS.

When the young plants have finished their first bloom, and are removed from the green-house to the open air, they should be cut into within five or six inches of the pot; if the plants have made a rapid growth, the pot will probably be very full of roots; if this should be the case, the plants should be turned out, and, after shaking the earth partly from the roots, the large ones should be wholly cut out, leaving only the small fibres. They should then be re-potted, either in the same sized pots they were turned out of, or in smaller ones if the roots will admit of being reduced. Place the plants in a sheltered and partially shaded situation when they are cut down, and expose them to the full sun by degrees, after the new wood has attained the length of an inch or more. If too many young shoots appear, the weakest should be rubbed off, that the re-

mainder may gain more strength. Such treatment is for plants which have flowered once, and are to be kept to bloom a second season. In re-potting or shifting young plants, the soil should be disturbed as little as possible, otherwise they might be checked in their vigour.

At the time the old plants are re-potted, should there be a frame at hand, with a very slight bottom heat, they may be removed thereto for a short time, until the young shoots have broken well, when the plants may be taken out into the open air, as before directed. If at any other time than that of cutting in the plants, they should need shifting, it should be borne in mind that at such period the ball of roots should not be disturbed. The routine of watering, &c., is the same as for young plants.

INSECTS.

The geranium is, fortunately, troubled with but few insects; indeed, the only one which ever infests them in any great degree, is the aphides, or green fly, which, sometimes, if allowed to become numerous, entirely destroy the beauty of the plants, and prevent their blooming; but they are by no means a very formidable enemy: unlike the red spider, the scale, or other enemies to plants, they are more easily and quickly destroyed than any other. A simple fumigation of the plants with tobacco will carry dismay into the phalanx of destroyers, and, unless exceedingly abundant, will be sufficient to clear the plants; but if as numerous as we have seen them, two successive fumigations will not be too much. After they are destroyed, give the plants a good syringing, to wash them well and clean the foliage. The scale sometimes attacks the plants, but not often enough to render any precaution against them important. Fumigation may be effected on a small scale, by placing the plants under a large box or cask, put the tobacco in a dish, set it burning, and then turn the box or cask upside down over the plants.

We have been thus minute in giving the manner in which we have cultivated the pelargonium for several years, in order that those, who have heretofore had no experience, may be enabled with what we have written, coupled with some judgment, to grow the plants to a high state of perfection. Those who have not found Mr. Russel's or Mr. Hogg's articles complete enough for their instruction, will, we hope, be enabled to find, in our remarks, what they may have left unsaid that is worth knowing. Such of our readers as have not read their observations at all, will, we trust, glean sufficient information from the above to supply, in part, their place.

It might be supposed, as a conclusion to this, that we should add a selection of the best kinds for general cultivation; but as they are continually increasing in number, as well as improving in beauty, it

would seem almost superfluous. What are now considered prime kinds, will probably, in a short time, be thrown out of cultivation altogether, and their places taken by others, new and superior.—For the guidance, however, of those persons who may be wholly unacquainted with the varieties, and who are willing to rely upon our judgment for a selection, we would recommend the twelve following kinds, for general growth in parlours:—General Washington (Boll's, said to be synonymous with Hericartidnum,) Perfection (Dennis's) (the Tom O'Shanter of collections around Boston,) Polybianum, Adelinæ, Queen Bess, Hill's Champion, Lovely Anne, Diadematum, Sir John Broughton, Tam O'Shanter (true,) Lord Denman, and Speculum Mundi. All these may be had at moderate prices.—*Hovey's Magazine of Horticulture and Botany, New-York.*

PRUNING ROSES.

The large showy roses that flower in June and July should be pruned in February. As many of the strongest young shoots as the tree is capable of supporting should be left, and the rest cut out; the branches left for flowering should be shortened back about one-third, and those intended for next year's wood to about three buds. By this method of pruning I have many roses with shoots from three feet to six feet long covered with blossom-buds. Those standards which have long shoots are hooped over each other, and produce a beautiful effect. Those dwarfs that admit of it have their shoots pegged down, or if planted close together they are intertwined, and thus the ground is covered with roses: if a little attention is paid to colour, a very pleasing effect may be produced. The young shoots intended for the next season are allowed to grow erect, and have the influence of light and air. My reason for this kind of pruning is, that as rose-trees usually begin to grow early, the first twelve inches of a shoot three feet long are produced when the soil is moist and the sun has but little power; the second twelve inches are added when the soil is becoming dryer, and the sun has greater influence, in June, July, and August, and on this part of the shoot the best flower buds are formed; the last growth takes place in the autumn, when the days decrease in length, and consequently this part of the shoot is not well matured. Roses should always be thinned in summer to increase the strength of those shoots intended to produce flowers next season. In November I cut back the arched branches, and cover the ground with a coat of well-rotted dung, and in the spring peg down the young shoots, as above described.—*R. Arnott, Cambrian Nursery, Charlton Kings, Cheltenham.*

AN ENUMERATION OF THE PRINCIPAL GENERA OF GREEN-HOUSE AND CONSERVATORY PLANTS; WITH THE SOIL EACH GENUS THRIVES IN.

INCLUDING THE MODE OF PROPAGATION, WHETHER FROM SEEDS, ROOTS, CUTTINGS, &c., &c.—BY C. M'INTOSH.

(Continued from page 276.)

	Soil.	*Mode of Propagation.*
Cobœa	Rich soil	Generally by seeds, and sometimes by cuttings.
Commelina	Peat and loam,	By seeds, and dividing the roots.
Convolvulus	Loam and peat	Some of the species by cuttings of the roots, others by seeds, and several by cuttings of the branches.
Coris	Peat and loam	Should be perpetuated by seeds, but is often propagated by cuttings.
Coronilla	Loam and peat	By cuttings freely.
Corræa	Peat and loam	Cuttings of the ripened wood strike pretty freely, particularly *C. alba* and *Veridiflora*, and are used as stocks, on which to inarch or graft the other rare sorts.
Crassula	Sandy soil	By cuttings, which should be partially dried before planting, as, being succulent, are apt to damp off.
Crotalaria	Peat and loam	By seeds, which often ripen, and also by cuttings of the young wood.
Crowea	Peat and loam	By cuttings.
Crucianella	Loam and peat	Cuttings root freely.
Cryptospermum	Loam and peat	Cuttings root freely.
Cunonia	Loam and peat	Ripened cuttings strike freely.
Cupressus	Peat and loam	Imported seeds are to be preferred, but some of the species strike by cuttings.
Curtisia	Loam and peat	Cuttings of the ripened wood strike freely.
Cussonia	Peat and loam	By cuttings.
Cyanella	Peat and loam	By offsets and also by seeds.
Cyclamen	Peat and loam	This genus may be said to be propagated by seeds only, which ripen under good management.
Cyclopia	Loam and peat	Cuttings of the young wood strike pretty freely.
Cynachum	Loam and peat	By cuttings.
Cyrilla	Sandy loam and peat	The green-house species is not readily propagated by cuttings. When seeds can be obtained, they should be carefully sown.
Cyrtanthus	Light rich mould	If care be taken to assist the impregnation of the flowers, seeds will be abundantly produced. They may be propagated also by offsets from the bulbs.
Cytissus	Peat and loam	By seeds and cuttings.
Dias	Peat and loam	By cuttings of the roots in a moderate temperature, and also by seeds.

	Soil.	*Mode of Propagation.*
Dampiera	Loam and peat	Cuttings of the young wood strike freely.
Daphne	Loamy rich soil	By cuttings of the young wood, but with greater certainty from the ripened shoots, taken off at a joint, in a moderate heat.
Daviesia	Sandy loam and peat	Cuttings about half ripe strike pretty freely. *D. latifolia* is not easily propagated.
Dendrobium	Sandy peat	By dividing the roots.
Dianella	Sandy loam and peat	Readily by seeds, or by dividing the roots.
Dicksonia	Sandy loam and peat	By seeds or by dividing the roots of old plants.
Digitalis	Peat and loam	By cuttings, but more readily from seeds, which ripen frequently.
Dilatris	Peat and light loam.	By offsets, bulbs, and also by seeds, which should be sown in leaf-mould.
Dillwynia	Sandy peat	By cuttings, which require great care.
Dimacria	L't. loam & sandy p't.	By the little tubers of the roots.
Dionæa	L't. peat & *sphagnum*	This curious plant is often lost, more for want of a proper atmosphere than for want of proper soil. It should be kept damp and partially shaded.
Diosma	Peat and loam	Cuttings of the young shoots root freely.
Disandria	Light loam	By cuttings freely.
Disperis	Loam and peat	By offsets.
Dodonæa	Loam and peat	By cuttings. By no means a showy genus, but much cultivated.
Dolichos	Loam and peat.	From seeds and cuttings
Doodia	Sandy peat & loam	Seeds vegetate freely and the roots are often divided.
Doryanthes	Peat earth	By suckers which rise from the roots of old plants, but not very frequently. Imported roots or seeds are most to be depended on.
Dorycnium	Peat and loam	By seeds and cuttings.
Dracocephalum	Peat and loam	By cuttings.
Drimia	Sandy loam and decayed leaves.	By offsets, from the bulbs, and from seeds.
Drosera	Peat and *sphagnum*.	Few foreign species are cultivated.
Dryandra	Peat and loam.	By cuttings, and by imported seeds.
Echites	Sandy loam & peat.	By cuttings, which root freely.
Echium	Peat and loam.	Part of the genus by cuttings, and others by layers, but most by seeds.
Edwardsia	Peat and loam.	By seeds, and also by cuttings.
Ekebergia	Loam and peat	By cuttings, which sdould not have their leav es shortened.
Elæocarpus	Peat and loam.	Cuttings of the ripe wood strike pretty freely; but as seeds are sometimes produced on large plants, they should be preferred.
Elegia	Sandy peat	By dividing the roots.

	Soil.	*Mode of Propagation.*
Elichrysum	Sandy peat	By cuttings of the young wood; and some cultivators succeed by making cuttings of large pieces of the branches.
Empetrum	Sandy peat	Cuttings of the young wood strike freely.
Empleurum	Sandy peat	By cuttings of the young wood.
Entelea	Peat and loam	Seeds sometimes ripen, by which plants are obtained, as well as by cuttings of the half-ripe wood.
Epacris	Sandy peat	This beautiful genus is not very readily increased. Young wood is usually chosen for cuttings, which succeed best when planted in autumn or winter.
Erica	Sandy peat	Most of the species are propagated by cuttings of the young wood, and many of them ripen their seeds, which vegetate freely.
Eriocephalus	Peat and loam	By cuttings of the young wood.
Eriospermum	Loam and peat	By offsets from the roots, or by seeds.
Erodium	Rich loam	By cuttings of the shoots, by seeds and by cuttings of the roots.
Erythrina	Rich loam and rotten dung	Readily by cuttings of the young shoots, when about half ripe.
Eucalyptus	Peat and loam	Vast quantities are originated from imported seeds. They propagate by cuttings, although not freely.
Euchilus	Peat and loam	By cuttings.
Euclea	Loam and peat	By cuttings.
Eucomis	Loam and peat	By offsets from the bulbs, or by planting the leaves, which will produce bulbs at the base.
Eugenia	Sandy loam or peat.	Cuttings of the ripe wood strike freely.
Euphorbia	Sandy loam	Cuttings of most sorts root freely.
Eustrephus	Peat and loam	By cuttings, and sometimes by seeds.
Eutaxia	Peat and loam	Cuttings of the young wood strike freely.
Exacum	Peat and loam	Readily by seeds, and also by cuttings.
Excœcaria	Light rich soil	By cuttings.
Fabricia	Peat and loam	By cuttings.
Falkia	Peat	By cuttings.
Ferraria	Light loam & peat	By offsets from the bulbs, and from seeds which ripen freely.
Ficus	Peat and loam	By cuttings.
Fuchsia	Peat and loam	All the genus readily by cuttings.
Galaxia	Peat & decay'd leaves	By offsets from the roots.
Galenia	Peat and loam	The young wood strikes freely.
Gardenia	Rich light soil	Most freely from cuttings.
Gastrolobium	Peat and loam	Seeds sometimes ripen, by which it is increased, and also by cuttings, which do not root freely.
Gazania	Light rich mould	Cuttings strike freely.
Gelsemium	Peat and loam	By cuttings.

	Soil.	*Mode of Propagation.*
Genista	Peat and loam	Cuttings of the young wood strike readily.
Geranium	Peat and loam	By seeds; cuttings of the roots of some species, and of the branches of others.
Giadiolus	Sandy loam and leaf mould	By offsets from the roots.
Globularia	Loam and peat	Cuttings of the young wood root readily.
Glossodia	Sandy loam & peat.	By seeds, and also by offsets from the roots.
Glycine	Peat and loam	Seeds often ripen, from which good plants are obtained. They also propagate by cuttings.
Gnaphalium	Peat and loam	Cuttings strike root with a little care, and seeds are sometimes obtained.
Gnidia	Peat and loam	By cuttings of the young wood.
Gomphocarpus	Loam and peat	By seeds which are often produced; also by cuttings in a mild bottom-heat.
Gompholobium	Peat	By cuttings and seeds.
Goodenia	Peat and loam	By cutttngs.
Goodia	Peat and loam	Seeds often ripen by which they are obtained, also by cuttings.
Gordonia	Peat and loam	Cuttings of the ripened wood strike root pretty freely.
Grevillea	Peat and loam	Cuttings of the ripe wood strike with care, and sometimes seeds are obtained of some of the species.
Grewia	Loam and peat.	By cuttings of the ripe wood.
Grielum	Sandy gravel	Cuttings root readily.
Gunnera	Loam and peat	By dividing at the root, and cultivated as an acquatic plant.
Hæmanthus	Rich sandy loam	By offsets from the roots.
Hæmodorum	Loam and peat	By dividing the roots.
Hakea	Peat and loam	By cuttings of the ripe wood, put in in winter or early in spring.
Halleria	Peat and loam	By ripened cuttings.
Hallia	Loam and peat	Cuttings of the young wood strike freely.
Hamiltonia	Loam and peat	By cuttings of the ripened wood.
Hebenstretia	Peat and loam	Cuttings of the young wood strike freely.
Hedysarum	Light rich soil	Both by seeds and by cuttings of the young wood.
Helianthemum	Sandy loam and peat	By seeds, and also by cuttings of the ripened shoots.
Heliophila	Sandy loam and peat	Principally by seeds, although cuttings of the young wood will strike root.
Heliotropium	Peat and loam	By cuttings of the young wood.
Hermannia	Peat and loam	By cuttings.
Herniaria	Light soil	Cuttings of the young wood root freely.
Hibbertia	Sandy loam and peat	By cuttings.
Hibiscus	Peat and loam	By seeds, and by cuttings.
Hippia	Light soil	By cuttings of the young wood.
Hippocrepis	Loam and peat	Cuttings strike freely.
Hoarea	Light turfy soil	This genus is increased by small tubers from the roots, which should not be planted deep, nor yet much watered.

(To be continued.)

THE ORCHARD.

ON THE ADVANTAGE OF PRUNING THE ROOTS OF PEAR TREES.

BY MR. THOMAS RIVERS, JR.

From a paper read before the Horticultural Society.

THE author stated, that in consequence of being inconvenienced by the confusion in the names of pears, he felt himself called upon to plant specimen trees of all the varieties he then possessed; but fearing that much ground would be wasted in the experiment, he endeavored to discover some means of arresting superabundent growth, and inducing early fruitfulness. After trying the effects of planting the trees in small square brick pits, and plunging them in large pots, both which methods were found too expensive, he took advantage of a piece of shallow loamy soil resting on a substratum of very hard white clay, through which he calculated that the roots of the trees would not penetrate, and he expected that the soil on the surface might be made rich enough to support the trees without vigorous and unruly growth. However, he found that the roots of trees are not so easily kept within bounds, and that those of the pears not being able to enter the hard clay, were wandering far and wide; the branches also keeping pace with the roots, and growing much too rapidly for his calculations as to the space each tree ought to have occupied. Having previously remarked for many years that apple trees growing in a firm loamy soil in his nursery, if removed one or two years consecutively, which in nursery culture often occurs, acquired a stunted and prolific habit, making abundance of bloom buds and bearing profusely, it occurred to him that if he could keep the roots of his pear trees in the same state by frequent removals, he should make them also acquire the habit he had so long observed in apples.

But in attempting to remove his pear trees, it occurred to the author that it would be less trouble to dig a trench round them, and cut all their roots at a certain distance from the stem; and in this respect his anticipations were completely fulfilled. Specimens of various kinds of pear trees thus treated were exhibited in support of the author's views.

In the Vallée franche the maximum of last year's shoots was four inches; this tree was arrested by root-pruning in December, 1838, and is now covered with blossom buds.

The Passe Madeleine, whose roots were pruned in December, 1838, made no shoots, but was covered with blossom buds.

In the Winter Nelis, the last season's growth was stated to be three inches; and the specimens exhibited were covered with blossom buds.

Mr. Rivers next proceeded to give some hints and directions as to the mode of operation. The best description of trees for the purpose of forming, what he calls, Garden Orchards, are half stan-

dards, with round, well formed heads, or plants trained *en quenouille*, or dwarfs in the usual bush fashion. For immediate effect these should be prepared by annual root-pruning for one, two, or three years in the nursery; but if not so prepared, trees of the usual size and quality, may be planted and suffered to remain two years undisturbed, unless the soil is rich, and they make vigorous shoots the first season after planting; thus, supposing a tree to be planted in November or December, it may remain untouched two years from that period, and then, early in November, if possible, a circumferential trench ten inches from the stem of the tree, and eighteen inches deep should be dug, and every root cut with a sharp spade, which should be introduced quite under the stem, about fifteen inches in depth, so as completely to intercept every perpendicular root. The treddle spade used in Hertfordshire is a very eligible implement for this purpose, as the edge is steeled and very sharp. The following year, the third from planting, a trench may again be opened at fourteen inches from the stem, so as not to injure the fibrous roots of the preceding summer's growth, and the spade again used to cut all the circumferential and perpendicular roots that are getting out of bounds; the fourth year the same operation may be repeated at eighteen inches from the stem; and in all subsequent root-pruning this distance from the stem must be observed. In the course of years, a perfect ball of fibrous roots will be formed, which will only require the occasional operation of a trench being dug and the ball being pared down, to ascertain whether large feeders are making their escape from it. But as this circular mass of soil will in a few years be exhausted, there is left round each tree a slight depression in the soil, or in other words the trench is not quite filled in, and this circular furrow is filled with fresh night soil, which has an excellent effect. As it did not come in contact with the roots, no injury resulted from the use of such a powerful manure; but the author was of opinion that there is no absolute necessity for liquid manure, as common dung may be laid round each tree in the autumn, and suffered to be washed in by the rains of winter, or drawn in by the worms. With regard to pruning the branches of pear trees thus brought into early fruitfulness, the author added, that all that is necessary is the occasional removal of a crowded branch, the fact being that root-pruning almost does away with the necessity of branch-pruning. Sometimes, however, a root will escape the spade, and then in the following summer a vigorous shoot or two will make their appearance; these should be shortened in August to within four buds of their base, and the following autumn the feeding root must be diligilently searched for. Mr. Rivers exhibited a specimen of shoots of this kind, the result of a root being left unpruned.

In conclusion he stated that he had practised root-pruning on apple trees for two years, and has reason to hope for perfect success; as also as with plums and cherries.—*Gardener's Calendar.*

GARDENER'S CALENDAR FOR JULY.

VEGETABLE GARDEN.

Sow Cabbages, Cauliflowers, Brocoli, Turnips, Ruta Baga, Carrots, Beets, Salsafy, Okra, Tomatoes, Snap Beans, Spinage, Endive, Radishes, Melons, Cucumbers, Squashes. Plant Irish Potatoes. Transplant Cabbages, Cauliflowers, Brocoli, Tomatoes, Leeks, Celery.

Remarks.—July may be considered as the commencement of the fall sowing season, though but very few seeds should be ventured at a time, for the rains and hot sun render it extremely difficult to get them up, and preserve the plants when up. All small seeds sown this month should be protected. When sown on a seed bed, it will be advantageous to make a scaffolding three feet high, on which pine boughs should be laid. These will shade and protect the young plants, and the leaves gradually droping will expose them gradually to the heat of the sun. Any of the large varieties of Cabbages may still be sown. The best Turnips for the present are the Early Dutch and Red Top. Sow but few, as they are liable to rot. Only as many Ruta Baga should be sown as will be used in a short time, for they soon become stringy.—This sowing should never be relied on for a winter's supply, however promising they may appear. It will be somewhat difficult to manage so as to secure a crop of Beets, Carrots and Salsafy, and only a few should be put in. Okra and Tomatoes sown now, will give an abundant crop towards the end of the season, and will last until destroyed by frost.

THE FLOWER GARDEN.

Biennial and Perennial seeds may yet be sown. The garden should be constantly and carefully overlooked, all weeds eradicated, the earth kept loose, and such plants as require it, supported by stakes. All decayed stalks and flowers should be removed, and none should be left in the garden after they have flowered. If seeds be wanted from any particular variety, it should be raised in the reserve garden. The flower garden should never be disfigured with dead and dying stalks. Cut off all Dahlia flowers as soon as they have passed their prime, and thus you will insure a better bloom in the fall.

The following having been received too late for insertion in its proper place, we give it here, that our readers may derive benefit from the information conveyed. [Ed. So. Agr.

For the Southern Agriculturist.

POTATO SLIPS.

Mr. Editor :—This being the most busy season for cultivating Potatoes from slips, I beg leave to say that I was informed by one of the most successful planters I ever knew—a practical, not a theoretical man,—that as soon as his Potato slips had taken good root, and had run a little, he always chopped across the vines with a hoe, and divided them midway between the open spaces in which the vines were sprouting, and that he invariably obtained a much greater production of Potatoes where this was done than where it was omitted. I asked him how he accounted for the effect—he said that he only knew it to be a fact, which could be proved by any one who would try the simple experiment. I have asked several planters if it was generally known or practised, and could not learn that it was; but one of them said he always observed that there were more Potatoes at the end of the rows, where the but ends of the slips had been laid together, than in any other part of that row or hill. If these two facts be put together may they not show that chopping the vines between the sprouts, made many but ends to the vines, from which the bearing roots would shoot off in every direction, producing more Potatoes.

June, 1841. B.